

Chapter 1 – Introduction

KEY POINTS

- The amount and value of freight are critical components of the overall economic health of Missouri.
- Missouri's multimodal freight system supports the movement of trucks, planes, barges, and trains as they transport over one billion tons of freight valued at more than \$1.2 trillion per year.
- Every resident in the State spends a significant portion of their disposable income (\$4,500 per year) on transportation, whether directly or indirectly, in the goods they purchase.
- Truck freight will continue to grow in importance based on both value and tonnage. While at a slower rate, the freight moved by air, water, and rail will also continue to grow.

Making smart investments in the freight transportation system can provide better options for Missouri businesses to get their products to both domestic and global markets. An improved freight transportation system can also lower transportation costs and create jobs.

With the help of hundreds of key stakeholders, the Missouri Department of Transportation (MoDOT) has drafted this State Freight Plan to make sure that freight continues to move smoothly. The plan provides a better understanding of Missouri's existing freight transportation system, establishes goals and strategies for updating the system over the next 10+ years, guides future investments in freight transportation, and prioritizes freight projects that would provide the most benefits.

MoDOT recognizes the importance of freight transportation in contributing to the economic vitality and competitiveness of the State of Missouri. In 2013, for example, Missouri exported \$12.9 billion in freight to foreign countries, representing a 79 percent increase in the past 10 years.

The Economic Importance of Freight

There are strong correlations between the amount or value of freight shipped and the overall health of a State or regional economy. The freight transportation system is how Missouri's four largest exports—transportation equipment, chemicals, food products, and machinery—are delivered around the world. Freight movement is vital to the State, and increases in freight transportation are directly related to increases in economic growth.

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The cost of transporting and storing freight directly impacts everyone. One study estimated that the average person in the United States spends approximately \$4,500 per year¹ in transportation and storage costs related to goods purchased and consumed. The cost of transportation is a significant portion of the price of a loaf of bread. Improving the efficiency of freight transportation can lower the cost of goods and result in more disposable income for consumers.

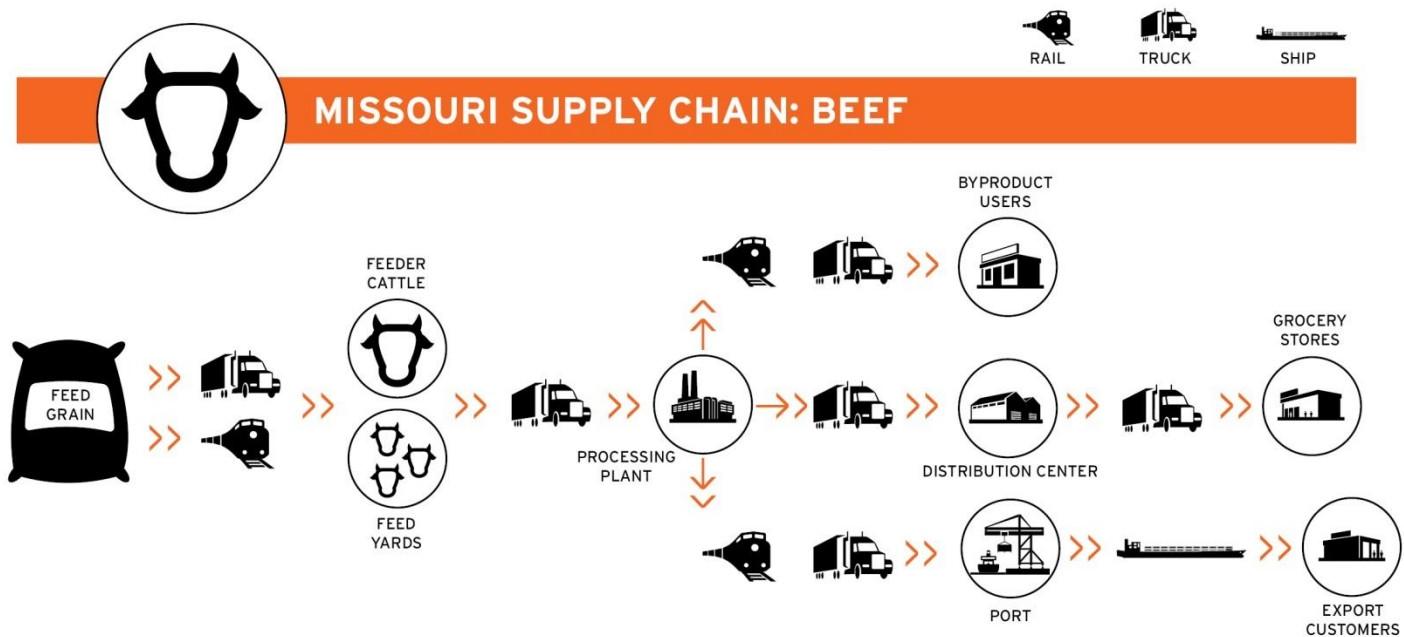
Supply Chains: Pathways for Products

Efficient freight transportation in Missouri is essential for industry supply chains. Supply chains are the pathways that raw materials and products move from their original sources, through the production process, and eventually to the end consumer. Supply chains have grown more sophisticated as businesses look to minimize supply chain costs and maximize profits. For example, Missouri is a major producer of beef. Feed grain and feeder cattle are imported to the feed yards. Finished cattle are then shipped to a meat processing plant to be processed, and then the meat is shipped to grocery stores or other final destination as a finished product (as illustrated in **Figure 1-1**).

¹ <http://www.cts.umn.edu/events/freight/2009/documents/murphy.pdf>

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Figure 1-1: Missouri Beef Supply Chain



Many products Missourians buy are created and delivered through these complex supply chains and each step uses the freight transportation network to deliver source materials and finished goods in a timely manner. If the freight network breaks down, so do these supply chains. The efficiency of these chains has a significant impact on how various businesses compete.

Current and Future Challenges

Over the next 20 to 30 years, the growth of freight transportation throughout the nation is expected to continue to accelerate. The reduction in and unpredictability of funds needed to maintain and improve the transportation network significantly impairs the ability to continue to improve the supply chain. All transportation modes—road, rail, air, and water—continue to experience congestion along major corridors and at key bottlenecks, including critical interstate highway interchanges; outdated and under-designed locks, dams, and ports; and the two largest rail terminals—St. Louis and Kansas City. Major air cargo hubs (i.e. Atlanta, Chicago, and Dallas-Fort Worth) are operationally sensitive to disruptions, such as from weather or maintenance. Delays at these major hubs often reverberate throughout the U.S. air system, including the Kansas City and St. Louis airports.

How Freight Travels in Missouri

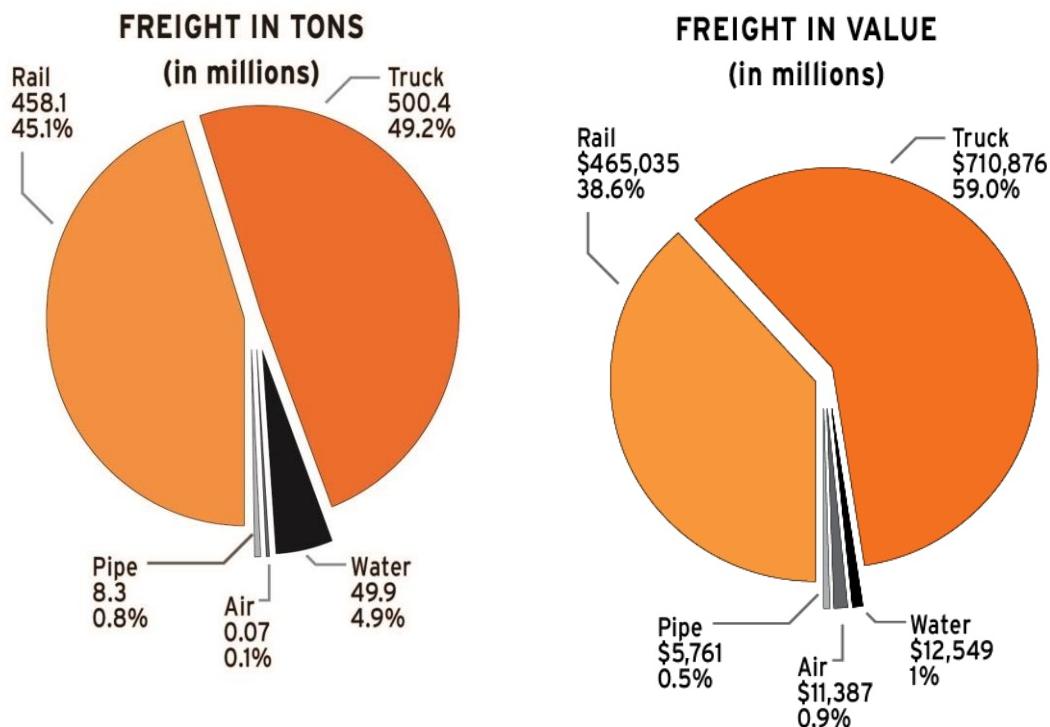
By far, the largest percentage of freight in Missouri travels either by truck on the roadway network or by rail. As shown in **Figure 1-2**, data indicate that trucks move 49 percent of the freight tonnage and 59 percent of the freight value in Missouri, while rail lines move 45 percent of the freight tonnage and 39 percent of the freight value. Waterways transport five percent of the freight tonnage and one percent of the freight value. Air cargo and pipelines combined transport approximately one percent of the

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freight tonnage and one percent of freight value in Missouri.

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Figure 1-2: Actual Freight Movement by Tonnage and Value per Mode (2011)

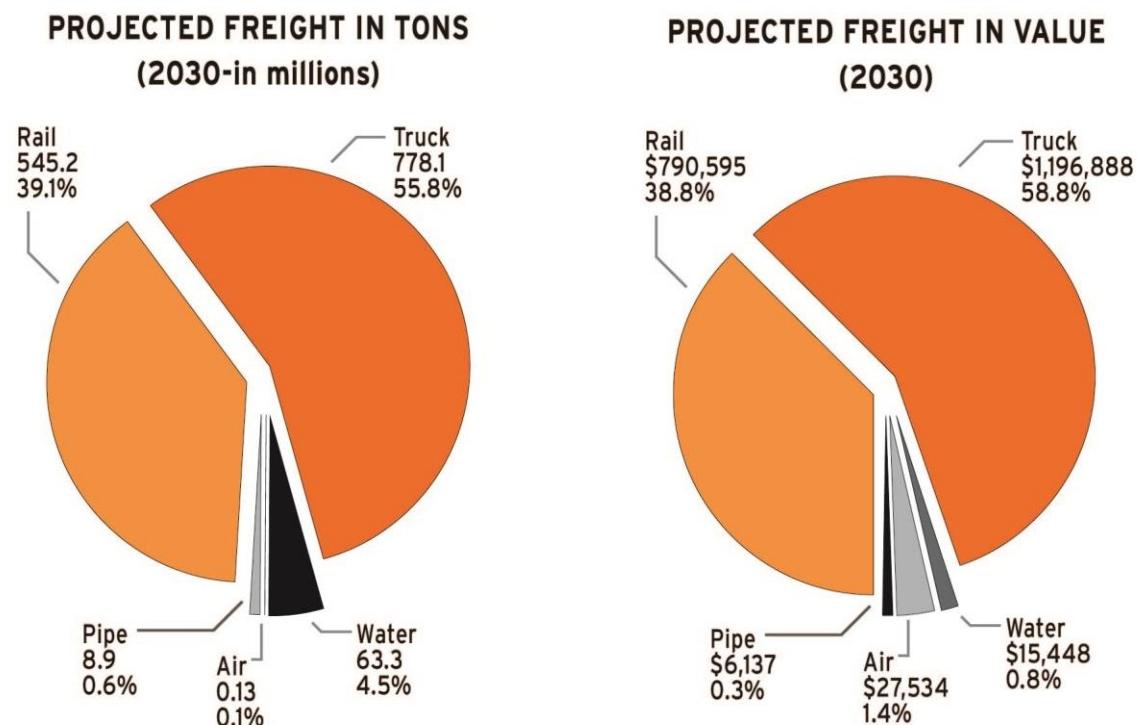


Source: Prepared by CDM Smith, based on Transearch® data for 2011

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Data suggests that truck and rail will be the dominant modes in 2030, as shown in **Figure 1-3**. Trucks are forecasted to transport 56 percent of the freight tonnage and 59 percent of the freight value, while rail lines are projected to transport 39 percent of the freight tonnage and 39 percent of the freight value in 2030. Waterways are expected to move five percent of the freight tonnage and one percent of the freight value in 2030. Air cargo and pipelines combined will transport approximately one percent of the freight tonnage and two percent of freight value in Missouri.

Figure 1-3: Projected Freight Movement by Tonnage and Value per Mode (2030)



Source: Prepared by CDM Smith, based on TRANSEARCH® data for 2011

Improvements in the truck freight network will continue to be critical to the freight system. However, all transportation modes are expected to see significant increases in freight tonnage. Improving the efficiency and reliability of alternative modes — rail, water, air, and pipelines — will grow in importance.

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Missouri Freight Goals

In 2013, MoDOT began *On the Move* stakeholder outreach activities to help identify a vision for the future of transportation in Missouri as part of an update to MoDOT's Long Range Transportation Plan. *On the Move* was a MoDOT initiative, completed in 2013, in which Missourians from all 114 counties were included in conversations about the State's transportation future.

This State Freight Plan is an offshoot of that planning effort that included four focus areas, or pillars, that drive transportation decisions at the statewide level. Building on the four pillars outlined in Missouri's Long Range Transportation Plan and through collaboration with freight partners, opportunities and actions have been identified as the goals of the Freight Plan.

These goals are:

- **Maintenance** – Maintain the freight system in good condition by keeping highways and bridges in good condition and supporting the maintenance of railways, waterways, airports, and multimodal connections.
- **Safety** – Improve safety on the freight system by decreasing the number and severity of crashes involving commercial vehicles and improving safety at railroad crossings.
- **Economy** – Support economic growth and competitiveness in the State through strategic improvements to the freight system.
- **Connectivity and Mobility** – Improve the connectivity and mobility of the freight system by reducing congestion and increasing reliability on the roadways; supporting improved efficiency of rails, waterways, and airports; and improving connections between freight modes.

On the Move was a MoDOT initiative, completed in 2013, in which Missourians from all 114 counties and the City of St. Louis were included in conversations about the State's transportation future.

Missouri's Long Range Transportation Plan also includes three strategic considerations that have been incorporated into this Freight Plan. These include:

- **Environmental** – Reduce and/or mitigate adverse environmental impacts of freight.
- **Organizational and Process** – Institute policies and practices that support the freight system, such as exploring funding flexibility and stability and using technology to improve operations on the freight system.
- **Customers and Partners** – Improve coordination and collaboration with freight stakeholders.

National Freight Goals

The Missouri State Freight Plan was organized to meet the requirements of the *Fixing America's Surface Transportation (FAST) Act* and the national freight goals developed as part of that legislation. The Freight Plan also supports the freight-related strategies and recommendations in Missouri's Long Range

As part of FAST ACT, the U.S. Department of Transportation directed states to develop a freight plan. The Missouri State Freight Plan fits within this guidance.

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Transportation Plan, which incorporates the key findings in MoDOT's Tracker, MoDOT's previous State Freight Study, Missouri's Statewide Rail Plan, Missouri River Plan, and other regional initiatives as they relate to freight mobility.

It is important that the Missouri State Freight Plan not stand alone, but instead align and be informed by the national, State and local plans and policies that already exist or are in development. FAST Act requires the U.S. Department of Transportation to develop a National Freight Policy that will include the following goals for the national freight system:

- Improve the contribution of the freight transportation system to economic competitiveness, reduce congestion and eliminate bottlenecks on the National Multimodal Freight Network (NMFN) and increase productivity, particularly for domestic industries and businesses that create high-value jobs;
- Improving the safety, security, and resiliency of the freight transportation system;
- Improving the state of good repair of the freight transportation system;
- Using innovation and advanced technology to improve the safety, efficiency and reliability of the NMFN
- Improve the economic efficiency and productivity of the NMFN;
- Improve the reliability of freight transportation;
- Improve the short- and long- distance movement of goods that travel across rural areas between population centers, travel between rural areas and populations centers, and travel from the Nation's ports, airports and gateways to the NMFN;
- Improve the flexibility of States to support multi-state corridor planning and the creation of multi-state organizations to increase the ability of States to address multimodal freight connectivity and
- Reducing adverse environmental and community impacts of the freight transportation system.

Figure 1-4 illustrates how MoDOT's goals and strategic considerations align with the national FAST Act goals.

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Figure 1-4: MoDOT Goals and Strategic Considerations

National Freight Goals	Missouri Freight Goals						Missouri Freight Strategies
	Maintenance	Safety	Economy	Connectivity and Mobility	Environmental	Organizational and Process	
(1) Increase economic competitiveness, reduce congestion and eliminate bottlenecks, increase productivity	*	*	*	*	*	*	*
(2) Improve the safety, security, and resiliency	*	*	*	*		*	*
(3) Improve the state of good repair	*			*			*
(4) Use innovation and advanced technology to improve the safety, efficiency and reliability	*	*	*	*		*	*
(5) Improve the economic efficiency and productivity	*	*	*	*		*	*
(6) Improve the reliability	*	*	*	*			*
(7) Improve the short- and long-distance movement	*	*	*	*		*	*
(8) Multi-State corridor planning and connectivity			*	*		*	*
(9) Reducing adverse environmental and community impacts	*			*	*		*

Plan Organization

The Missouri State Freight Plan is organized so that the elements required by FAST Act are met within the following chapters:

Chapter 1, Introduction – Establishes the context for the creation of the Missouri State Freight Plan. This chapter identifies the strategic goals of the plan and how they dovetail with other federal and State policies and plans.

Chapter 2, Stakeholder Outreach – Outlines the extensive outreach and involvement activities that were performed throughout the planning process. This chapter summarizes information from key freight stakeholder interviews, as well as motor carrier, shipper, and receiver survey results and analysis

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along with input received at forums and through website comments.

Chapter 3, Missouri Freight System – Includes an overview of the various components that make up the freight system. The chapter provides a summary of existing transportation assets and data on freight movement.

Chapter 4, Freight Network Conditions and Performance – Provides an analysis of conditions of the freight system including bottlenecks, level of service, safety and crashes, and pavement and bridge conditions. The chapter also discusses performance measures for these areas.

Chapter 5, Needs Assessment and Freight Forecast – Looks at freight system needs through an analysis of the identified strengths and problems. The chapter looks at the 20-year State freight forecast, emerging trends, and freight impacts on communities.

Chapter 6, Economic Context of Freight – Outlines the importance of freight in the State's economy. The chapter looks at the role of freight in supporting job creation, economic development, supply chains in Missouri, and regional economies.

Chapter 7, Freight Policies, Strategies, and Institutions – Discusses the State's freight policies and strategies for guiding freight-related transportation decisions. The chapter includes discussion of funding programs, freight-related institutions, freight roles and responsibilities, private infrastructure owners, statutory and constitutional constraints, regional freight planning activities, and the State's priorities.

Chapter 8, The Decision-Making Process – Lays out the State's process for identifying freight transportation improvements. The chapter describes how the various strategies, projects, and policy changes were considered and prioritized.

Chapter 9, Strategies and Recommendations – Outlines recommendations for programs, policies, and projects that address the needs identified in Chapter 5.

Chapter 10, Action Plan and Implementation Strategies – Outlines the next steps to include organizing the Freight Advisory Committee (FAC), identifying funding and financing options, and establishing action steps to implement the freight strategy and goals.

Appendices – Provides addition detailed information and analysis used to prepare the Missouri State Freight Plan and include:

- Appendix A: Assets and Freight Flow
- Appendix B: Trends, Needs, and Issues
- Appendix C: Strengths and Challenges
- Appendix D: Stakeholder Outreach
- Appendix E: Goals and Performance Measures
- Appendix F: Scenario Planning
- Appendix G: Freight Project List
- Appendix H: Freight District Summaries

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- Central District
- Kansas City District
- Northwest District
- Northeast District
- St. Louis District
- Southeast District
- Northwest District
- Appendix I: Freight Modal Profiles
 - Highways
 - Rail
 - Ports/Waterways
 - Air Cargo
 - Intermodal Connectors
 - Pipelines
 - Freight Commodities
 - Trade and Growth
- Appendix J: Freight Topical White Papers
 - Intermodal Transloading
 - Airports
 - Port Investment in Container-on-Vessel Service

Chapter 2 - Stakeholder Outreach

KEY POINTS

- Stakeholder input was integral in the development of the Missouri State Freight Plan – from qualitative assessments of freight infrastructure conditions, to highlighting what the State needs to do to be economically competitive, to shaping the freight project prioritization process.
- MoDOT learned that the most effective way to gather input from freight stakeholders is to go to them, where they work and gather for industry meetings.
- Stakeholders' top concerns center on the maintenance and capacity of I-70 and the need for better multi-modal connections.

Introduction

Hundreds of freight stakeholders were involved in helping MoDOT create the Missouri State Freight Plan that identifies strategic investments in the system and helps bolster Missouri's economy today and in the decades to come. Outreach efforts focused on reaching out to stakeholders such as logistics directors, shipping managers, economic development professionals, and leaders in private industry. Those that use the system most offered their perspectives on the conditions, issues, and needs of the freight network.

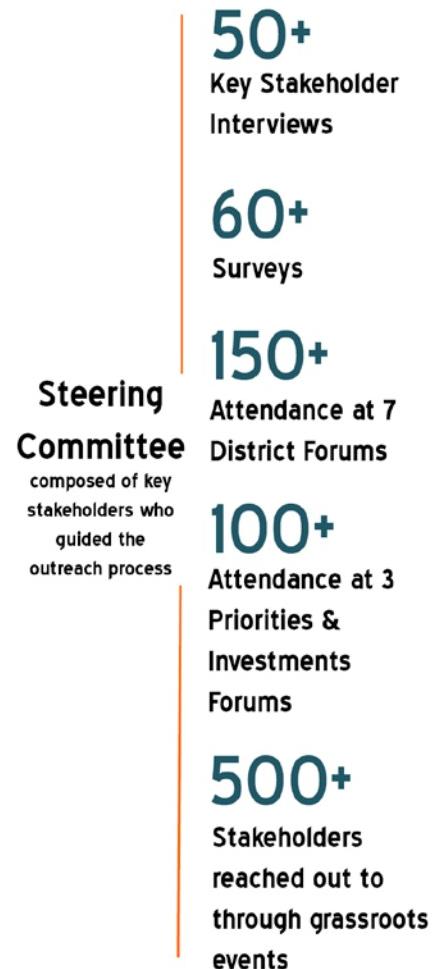
The goals of stakeholder outreach were to:

- Better understand, as an agency and as a State, what the costs are to Missouri's economy if the freight network stagnates or deteriorates.
- Articulate what freight projects would be most helpful to the State if additional funds were made available.
- Collect thoughts on making businesses and communities more competitive – whether through improvement projects or policy changes.

From November 2013 to July 2014, MoDOT engaged key freight stakeholders via surveys, interviews, multiple rounds of forums, and direct/grassroots outreach throughout the State. All activities were guided by the Freight Steering Committee made up of key stakeholders and MoDOT leadership. Figure 2-1 summarizes stakeholder outreach efforts.

Stakeholder input has influenced each piece of the Freight Plan, from the development of a prioritized project list to policy recommendations.

Figure 2-1: Summary of Stakeholder Outreach



Chapter 2 - Stakeholder Outreach

Guiding the Plan: How Stakeholders Provided Input

Freight stakeholders provided valuable input and helped guide MoDOT during the entire life of the project and at project milestones.

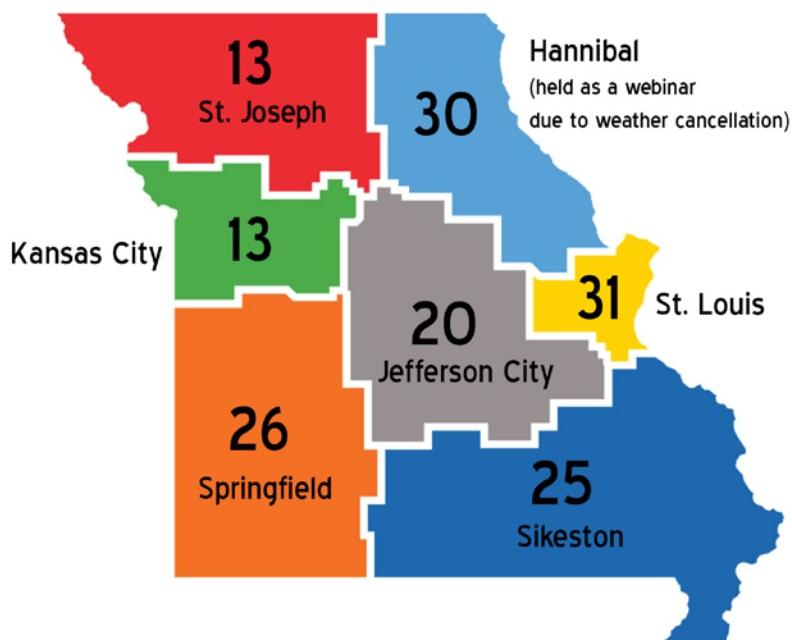
Input was provided by:

- A **Freight Steering Committee** made up of freight and State leaders and select members of MoDOT leadership. The committee—representing a diverse group of freight interests—convened monthly to provide feedback, reviewed materials, and helped connect MoDOT to other stakeholders. A full listing of Freight Steering Committee members is available in Appendix E.
- **Key Freight Stakeholder Interviews and Surveys** from leaders in freight-related services including manufacturing, economic development, logistics, and carriers. MoDOT discussed with these stakeholders the strengths, weaknesses, and investments needed in the freight network. A listing of the interviews and surveys is available in Appendix A.
- **Surveys emailed to 1,300 plus stakeholders and available on the project's website, www.MoFreightPlan.org, to gather feedback from the general public.**
- **Grassroots meetings** with currently existing freight interest groups and associations; such as supply chain management groups and trucking, port, and railroad associations throughout the State.
- **District and Regional Forums** that brought together hundreds of key stakeholders from across the State to discuss the plan with MoDOT. These forums are outlined below.

District Freight Forums (January-February 2014)

Building on the stakeholder interviews and surveys, freight forums were held in each MoDOT district to discuss freight issues and opportunities with a broader set of freight stakeholders. Forums were held across the State, as shown in Figure 2-2.

Figure 2-2: Number of Stakeholders in Attendance at Each District Freight Forum



In all, more than 150 stakeholders participated in these discussions and provided valuable feedback to Freight Plan efforts.

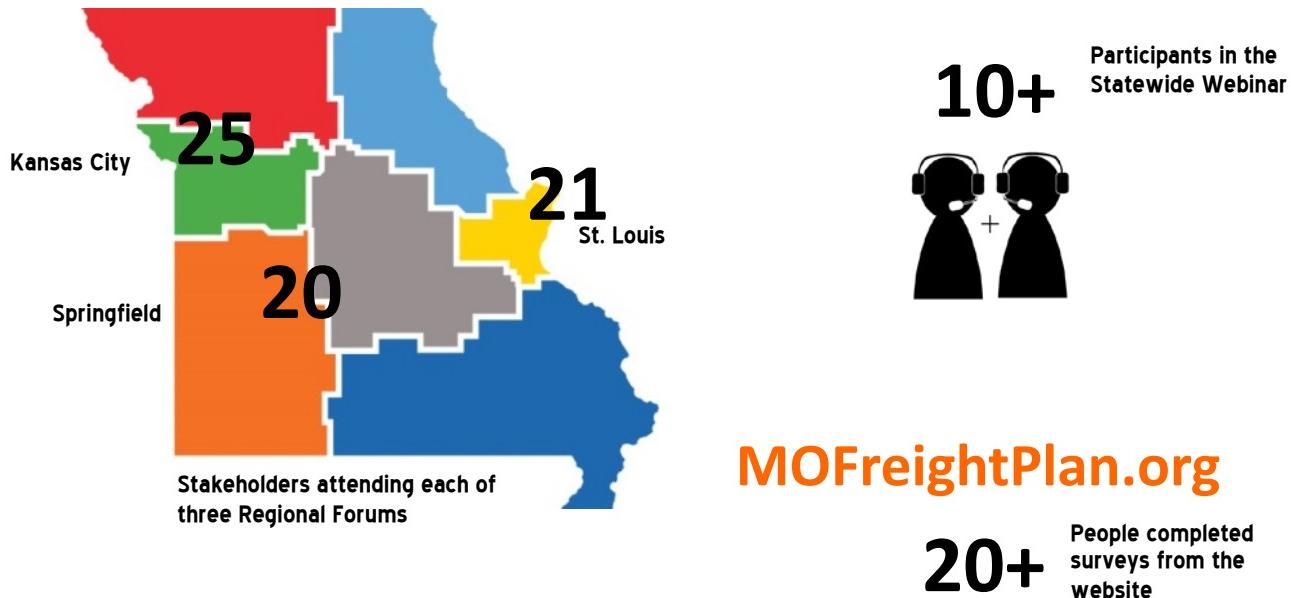
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Regional Priorities and Investment Forums (April-May 2014)

Close to 100 stakeholders were engaged in the Regional Priorities and Investment Forums. Three regional forums held in Kansas City, St. Louis, and Springfield hosted a combined total of 65 stakeholders. An additional 30 stakeholders participated in a statewide focused webinar held in early May or in surveys made available on the website for those stakeholders who were not able to participate in any of the forums (see Figure 2-3).

Stakeholders participated in several exercises to identify types of projects important to them and the region and provided guidance to the project team in creating a list of priority freight projects.

Figure 2-3: Number of Stakeholders Engaged in Regional Priorities and Investment Forum Activities



=~100 Engaged Stakeholders

Comment Period Process (October 2014)

The draft State Freight Plan was available for public comment from October 1 to October 31. The following outreach efforts and activities happened during the public comment period:

- A survey, targeting key stakeholders, was posted on the project website to gather input about the draft plan.
- Project team members reached out to existing groups of freight stakeholders to schedule opportunities to present the draft plan and solicit feedback.
- The draft plan was presented during a webinar on October 14 during which participants could provide comments. The presentation used during the webinar was then posted to the project website.
- Stakeholders who had previously participated in the planning efforts were sent an email outlining the variety of ways they could review the draft plan and provide comments. From that email, stakeholders could also request a speaker for a group presentation.

Chapter 2 - Stakeholder Outreach

The State Freight Plan website was updated to include:

- The draft plan posted for public review.
- A graphic communicating the work done to-date and the work expected in the coming months.
- A link to the survey being used to gather comments.
- Information about the webinar presentation, including a link to the presentation given during the webinar.

During the comment period, 80 comments were submitted via the website, grassroots events, and the webinar discussion.

Listening to Missourians: What MoDOT Heard

Stakeholders spoke to a number of consistent themes and helped identify a series of important projects for Missouri's freight network.

Consistent Statewide Themes

Reoccurring themes—throughout the State and regionally—emerged during stakeholder outreach. As shown in Figure 2-4, themes include:

- Missouri generally has a well-connected road network. It is good until there is a hiccup such as congestion, weather, or construction. However, there is a need for capacity and maintenance improvements to maintain the reliability of the network. Maintenance and improvements along I-70 were mentioned most consistently.
- There is a need to integrate freight networks for better multimodal connectivity.
- MoDOT should engage all stakeholders, both public and private. An example of a group that hasn't traditionally been engaged in freight discussions is those who represent railroads.
- There is a need to investigate possibilities for using waterways including Panama Canal expansion opportunities, increasing dredging, and updating locks and dams on the Mississippi River.

Figure 2-4: Statewide Themes During all Stakeholder Outreach Efforts

What have we heard during outreach across the state?



Generally, well-connected road network, but...



Connect all freight modes



Engage all stakeholders



Utilize waterways



Priority Project Types

During the three Regional Priorities and Investment forums, stakeholders were also asked to identify types of statewide and regional projects that MoDOT should consider high priority. They included:

All Regions

- Maintenance and improvements along I-70.

Kansas City

- Increased capacity and improvements at ports.
- Increased safety across all modes.
- Rail-highway at-grade crossing improvements and grade separations.
- Waterway and port infrastructure and terminal improvements (i.e., building, storage facilities, equipment).

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St. Louis

- Multimodal approach focused on strategic economic development efforts.
- Roadway improvements that address first and last mile as well as accommodate wider and heavier loads.
- Improved container handling for all modes.
- Improved cargo facilities, such as aprons, and their connections to warehouses or distribution centers.
- Harbor and channel dredging along the Mississippi River.
- Improved connections from airport cargo areas to other modes.

Springfield

- Maintenance on shoulders.
- Connectivity—i.e., rail spurs to industrial parks.
- Additional truck parking facilities and improving in-cab notification technologies.
- Additional roadway lanes.
- New truck arterials.

Purpose of Key Stakeholder Input

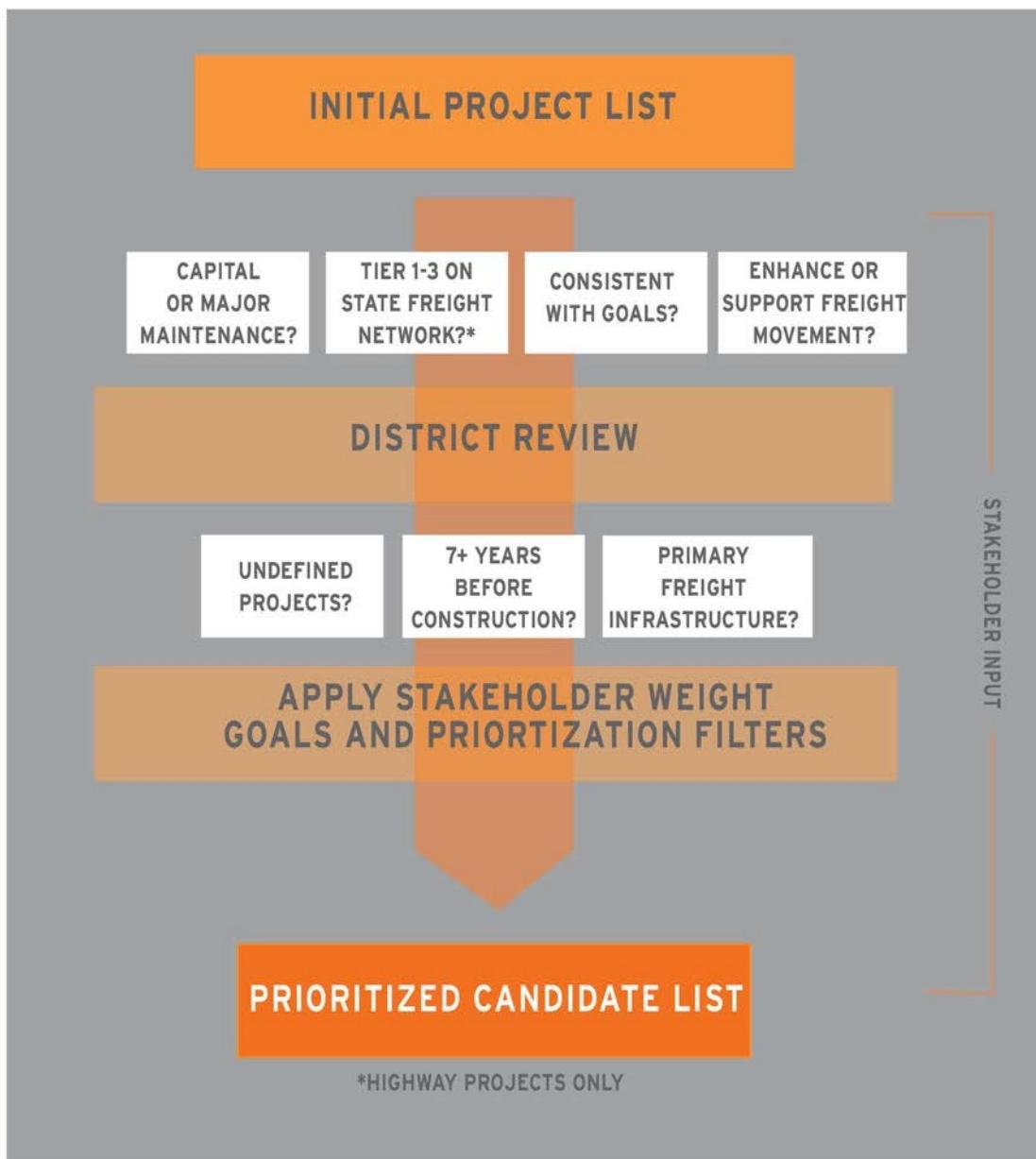
MoDOT used more than 1,300 stakeholder contacts during the Freight Plan process to develop a plan well-vetted by Missourians who are the most involved and affected by freight network movement and development. The purpose of these open dialogues with key stakeholders was to gather input on stakeholders' priorities as well as to inform them on plan progress.

Stakeholders provided input on:

- An inventory of freight assets and assessment of needs that includes statewide data that did not exist before this plan.
- What Missouri needs to do to be competitive and attract economic development to the State.
- A defined State freight network.
- Weighted freight goals and priorities that line up with goals of the State's last long-range planning effort.
- Strategic recommendations and an action plan (found in Chapters 9 and 10) that can be used moving forward.
- A list of prioritized investments and a project list based on the weighted goals and priorities from stakeholders; see **Figure 2-5** for how stakeholders were involved in crafting this list.

Chapter 2 - Stakeholder Outreach

Figure 2-5: Project Prioritization Process Using Stakeholder Input



Chapter 2 - Stakeholder Outreach

Forming Partnerships and Moving Forward

After the Missouri State Freight Plan has been finalized and recommendations have been made, MoDOT will continue to build upon relationships formed and enhanced during the Freight Plan process. There is a commitment that this Freight Plan will not sit on a shelf and gather dust, regardless of existing transportation funding.

A complete listing of strategic recommendations from the Freight Plan is covered in Chapter 9. Listed below are examples of those that MoDOT will continue to work on with key stakeholders:

- Implementing a freight advisory committee made up of leaders from the public sector, private companies, elected or appointed officials, and other planning partners.
- Improving multimodal connectivity.
- Helping in future efforts to develop comprehensive freight corridors.
- Working to leverage private sector investment to gain political support for public investment.
- Ensuring rural accessibility/just-in-time performance needs are considered during planning and project selection.
- Working to create statewide and district processes for programmatic freight projects.

Lessons Learned

Through drafting and vetting this Freight Plan, stakeholders communicated and reaffirmed some lessons for MoDOT on how best to communicate with them, engage additional stakeholders, and identify high level concepts always to consider when discussing freight in Missouri.

- Engaging all freight interests is more complicated than simply having public meetings. The most effective way to engage with these stakeholders is by doing grassroots outreach and going to meet private stakeholders at industry-specific events and conferences.
- Economic development and freight go hand-in-hand. Be prepared to talk about economic impacts.
- There are opportunities for no- or low-cost partnerships to enhance freight opportunities in the State.
- Public and private stakeholders are concerned about a lack of adequate dedicated revenue for transportation projects.

Chapter 3 – Missouri Freight System

KEY POINTS

- One of the key products of this Missouri State Freight Plan is a defined Missouri freight network. This is the first time Missouri has had a defined freight network. That is important for several reasons, chief among those: a proposed improvement project must be located on or adjacent to the defined freight network to be considered in the freight prioritization process.
- The top 100 freight generators in Missouri were identified based on truck activity. This information helped support the identification of the freight network and shaped the prioritization process.
- Freight and commodity flows underscore the role Missouri plays as a bridge state for the nation, as most freight travels through our state instead of starting or ending here.

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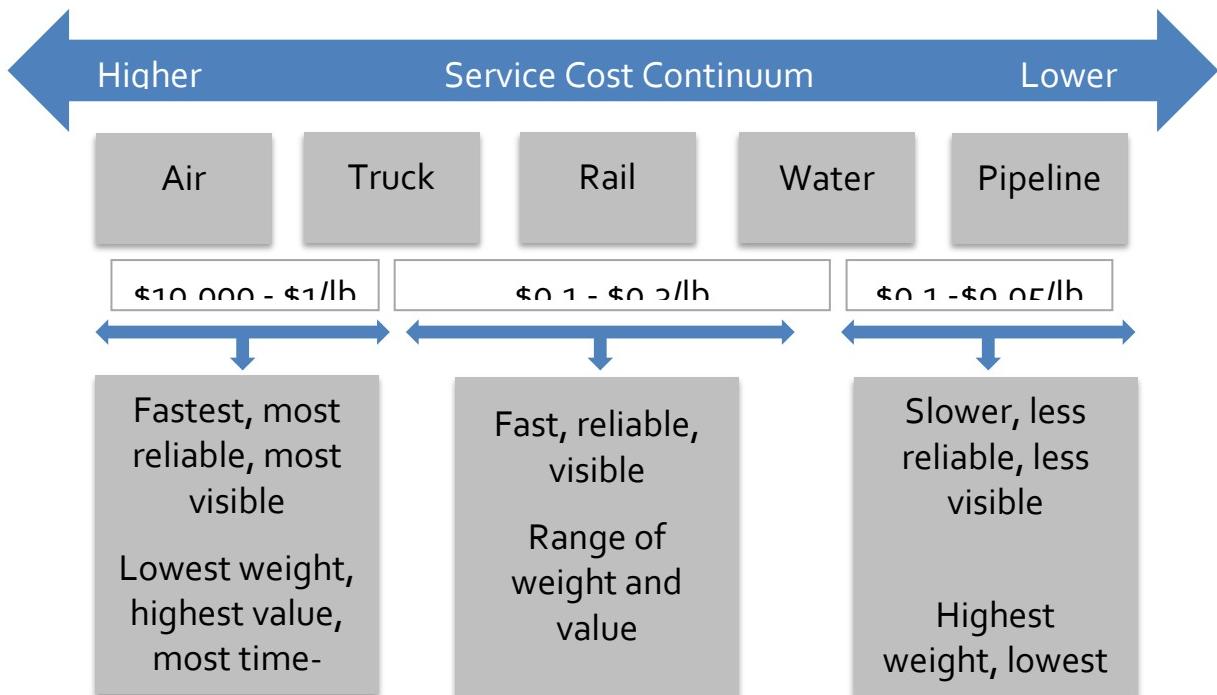
Missouri is at the freight crossroads of America. As the geographic and demographic center of population for the United States, Missouri is well positioned as the country's freight nexus.

Missouri's freight system is a network of highway, rail, air, water, pipeline, intermodal facilities, and freight generators that together move goods and commodities. The freight system is how Missouri products like soybeans and aviation parts are transported around the world. An understanding of the key features of the Missouri Freight Network is integral to understanding the strategies and future goals outlined in this Missouri State Freight Plan.

The freight system offers a range of service options. The best freight service for a particular shipment depends on the shipment weight, shipment value, the origin and destination, when the product is needed, security and safety, transportation costs, and customer needs. As shown in **Figure 3-1**, shippers use different freight modes depending on the type of shipment. All these freight modes are elements of the Missouri freight system.

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Figure 3-1: Range of Freight Service Options



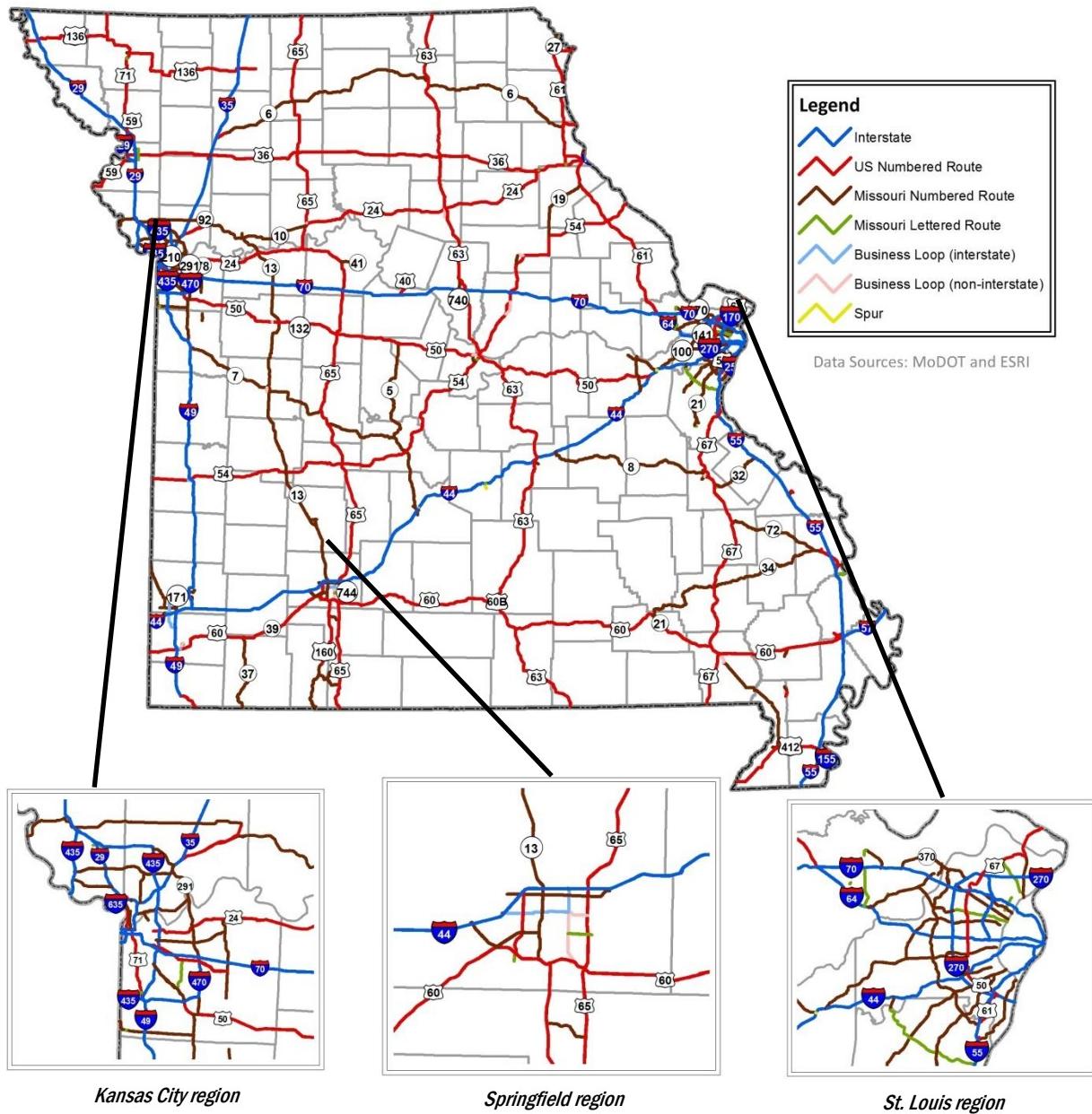
Source: Federal Highway Administration

Highway

Missouri has the seventh largest state highway system in the United States. It is made up of approximately 33,700 centerline miles of roadway, 5,500 of which are classified as heavily traveled "major highways" and 28,200 miles of which are defined as lesser traveled "minor highways." Missouri's major highways are just 20 percent of the State highway miles, but carry 80 percent of the system's traffic and the majority of the highway freight traffic. There are 18 Interstate Highways within Missouri, including 9 main routes and 9 auxiliary routes. The more than 10,000 bridges that cross rivers, other highways, and valleys are also important elements of the highway system. **Figure 3-2** shows the Missouri major highway system, which defines many of the paths on which freight moves.

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Figure 3-2: Missouri Major Highway System



Chapter 3 – Missouri Freight System

Rail

Railroads are categorized as Class I, II, or III depending on operating revenues. In 2012 dollars, a railroad with operating revenues greater than \$433.¹ million for at least three consecutive years is a Class I railroad. A railroad with revenues greater than \$34.7 million but less than \$433.² million is a Class II railroad, commonly referred to as a “regional” railroad. A railroad not within the Class I or II categories is considered a Class III railroad, also known as a “short line.”

Missouri has a significant freight rail infrastructure with six Class I freight railroads currently operating on 4,218 miles of main track rail lines, 2,500 miles of yard track, and approximately 5,697 public rail-highway crossings within the State. There are no Class II railroads operating in Missouri; however, five short line railroads serve Missouri. The short line railroads collectively own and operate 426 track miles, varying from the smallest with 33 track miles to the largest with 331 track miles. **Figure 3-3** shows railroad ownership in Missouri.

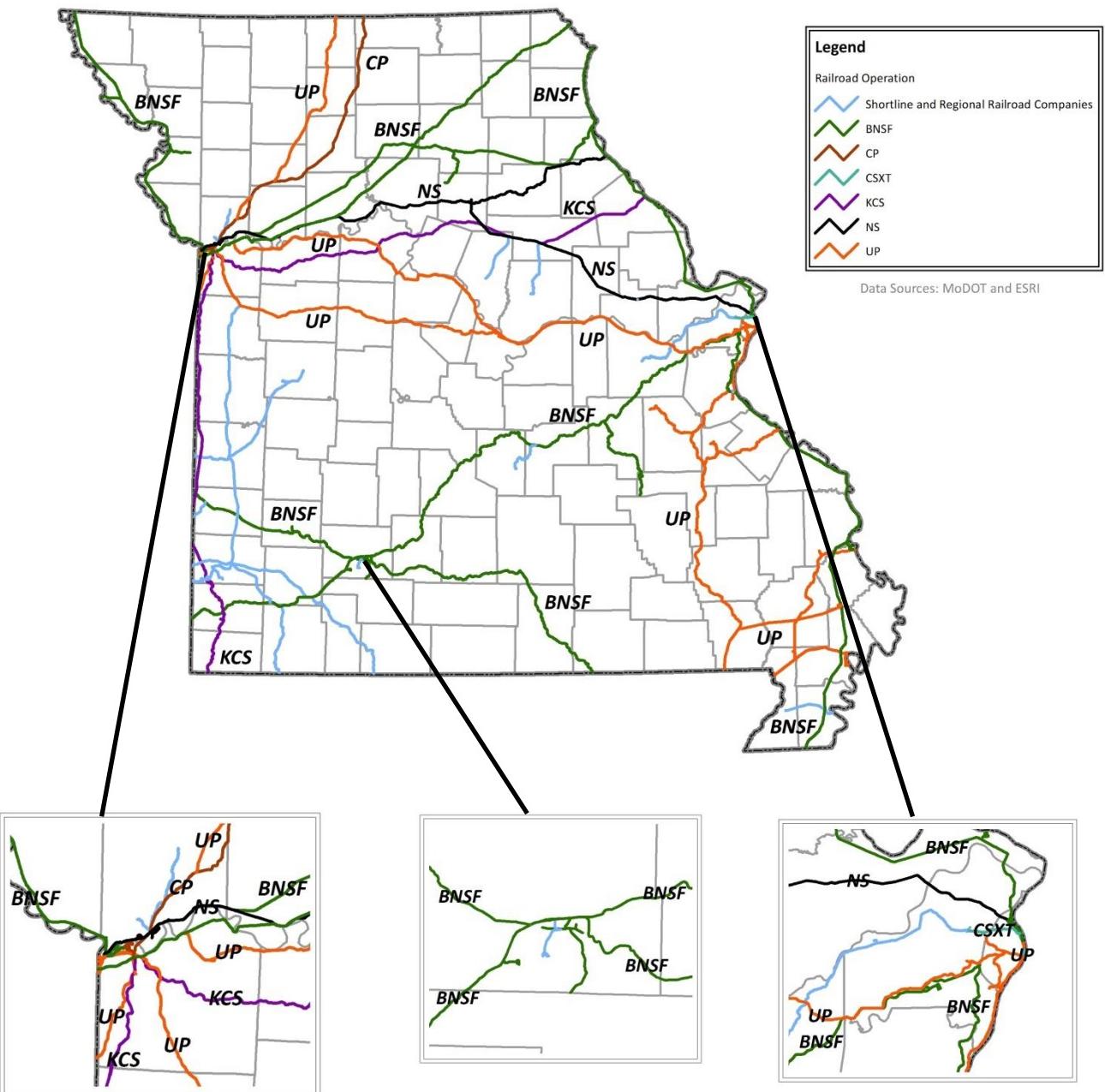
At-grade rail crossings present potential roadway safety and delay issues. There are over 5,697 at-grade railroad crossings within Missouri, including freight railroad, Amtrak, and commuter rail operations.

¹ http://www.aslrra.org/about_aslrra/faqs/

² http://www.aslrra.org/about_aslrra/faqs/

Chapter 3 – Missouri Freight System

Figure 3-3: Missouri Railroad Ownership



Chapter 3 – Missouri Freight System

Water

Missouri waterways move an average of \$12.5 billion in cargo annually. The State contains 1,050 miles of navigable rivers, including 500 miles of the Mississippi River and 550 miles of the Missouri River. The Mississippi River is divided into the Upper Mississippi (nearly 860 miles) limited by a series of locks and dams and the Lower Mississippi (1,480 miles) with uninterrupted flow south to the Gulf of Mexico.

A total of 14 public ports and more than 200 private ports can be found along Missouri's waterways. There are eight active ports; six of the eight shipped product within the last year, and two of the eight did not. There are six developing ports which currently do not have a public port facility. **Figure 3-4** shows the port authority locations.

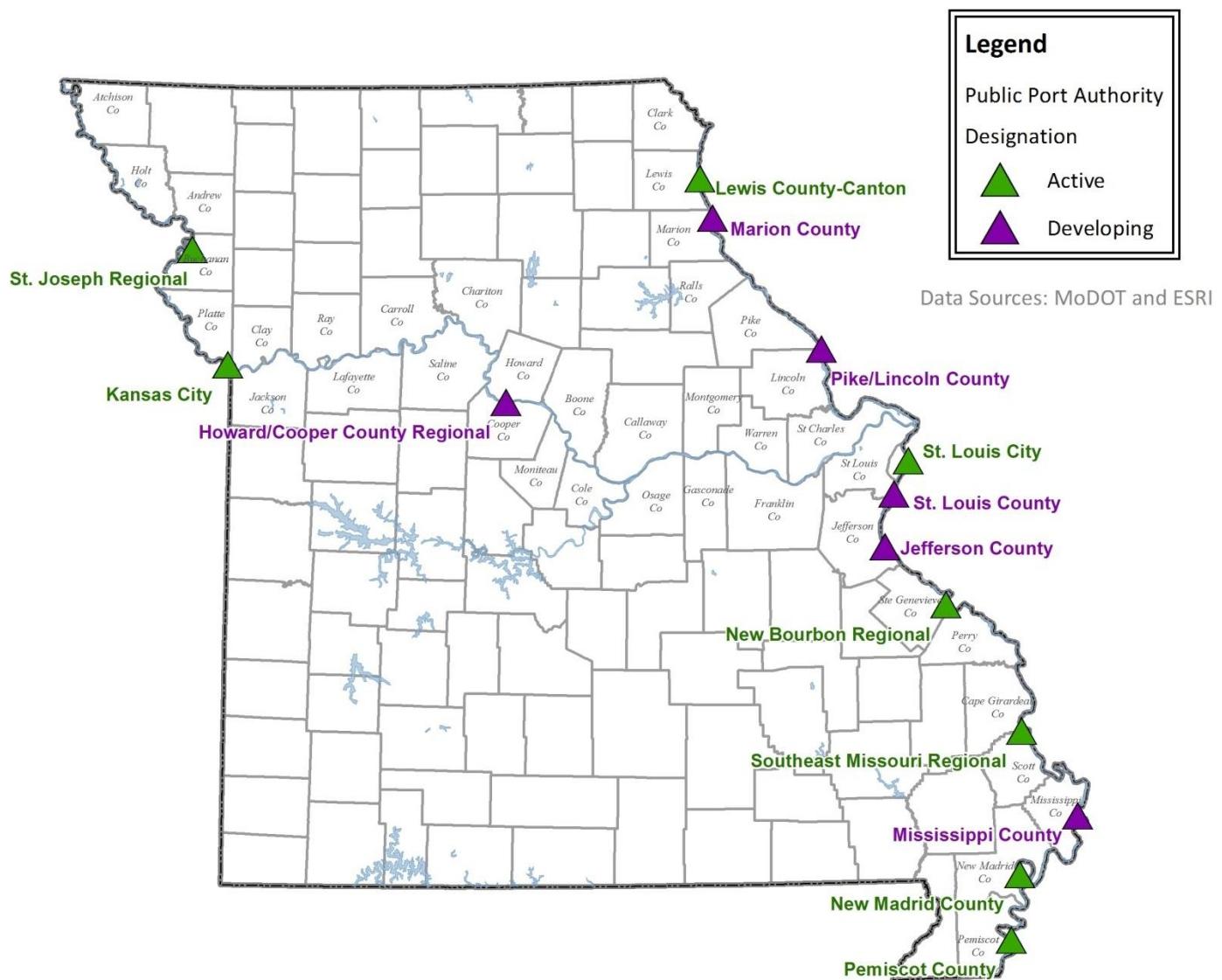
Since 2009, the U.S. Department of Transportation (USDOT) has designated several marine highways for transporting cargo on water, thereby reducing pollution and congestion on roads. Designated marine highways receive preferential treatment for federal assistance from the U.S. Maritime Administration (MARAD). Marine highways serving Missouri include:

- M-29 connecting the Upper Missouri River from Kansas City to Sioux City, Iowa
- M-70 covering the Missouri River from Kansas City to St. Louis
- M-35 recently approved and covering the Upper Mississippi River from the Twin Cities to St. Louis
- M-55 connecting the Illinois River from Chicago to St. Louis and then the Mississippi River from St. Louis to the Gulf of Mexico

Figure 3-5 shows the marine highways serving Missouri.

Chapter 3 – Missouri Freight System

Figure 3-4: Missouri Public Port Authorities



Source: MoDOT and ESRI

Chapter 3 – Missouri Freight System

Figure 3-5: U.S. Marine Highway Routes



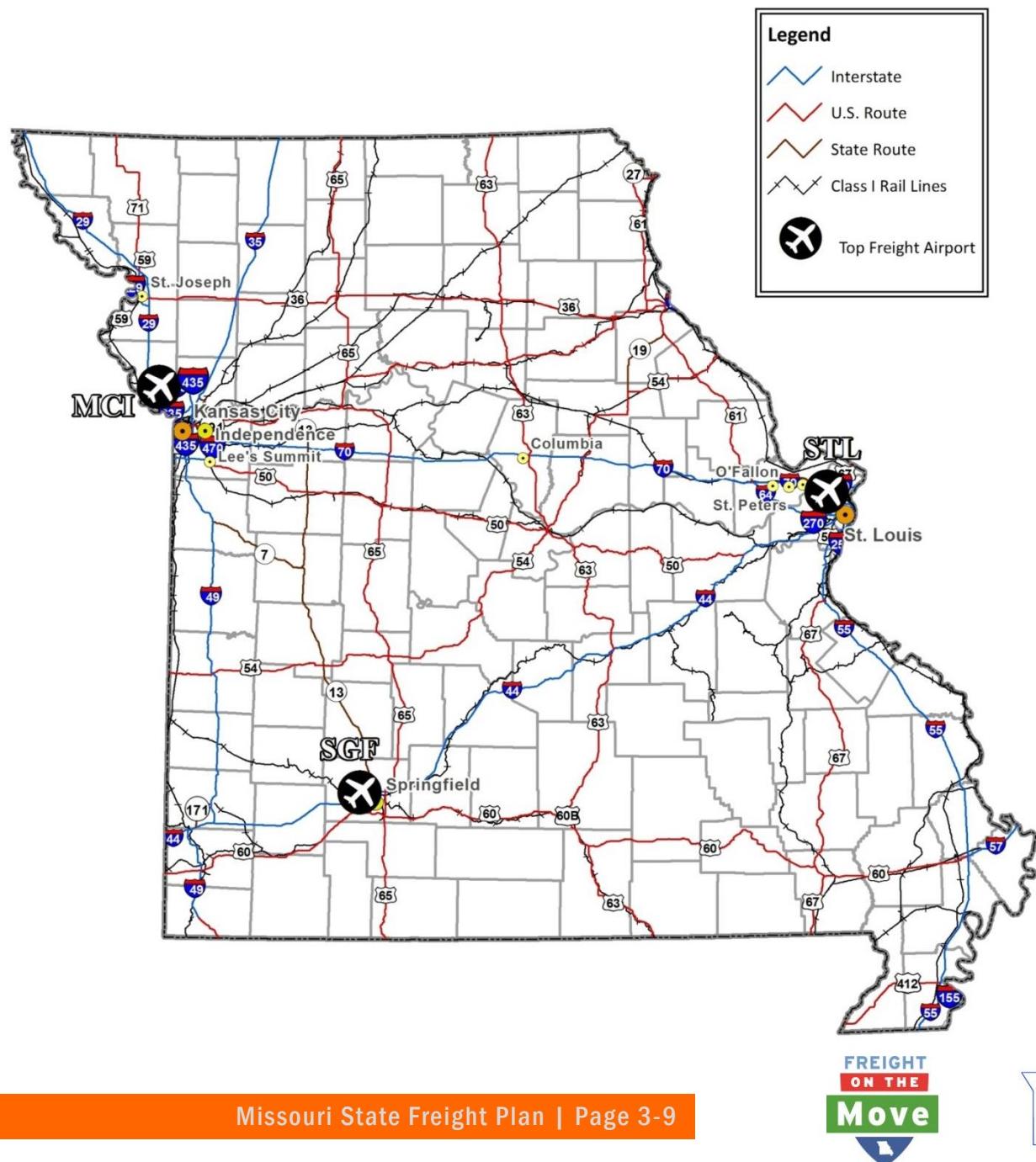
Source: U.S. Department of Transportation

Chapter 3 – Missouri Freight System

Air

Missouri is home to three of the top 110 cargo airports in North America in terms of total tonnage in 2012. These three airports handled nearly 170,000 tons of air cargo in 2011, which is a decrease of 4.9 percent annually since 2001. In this same time frame, Missouri's fastest growing airport by total tonnage was Springfield-Branson National (SGF) at 0.79 percent increase annually. Kansas City International and Lambert – St. Louis International airports both experienced decreases in total air cargo from 2001-2011. **Figure 3-6** shows Missouri's top freight airports.

Figure 3-6: Missouri Top Freight Airports



Chapter 3 – Missouri Freight System

Source: MoDOT and ESRI

Chapter 3 – Missouri Freight System

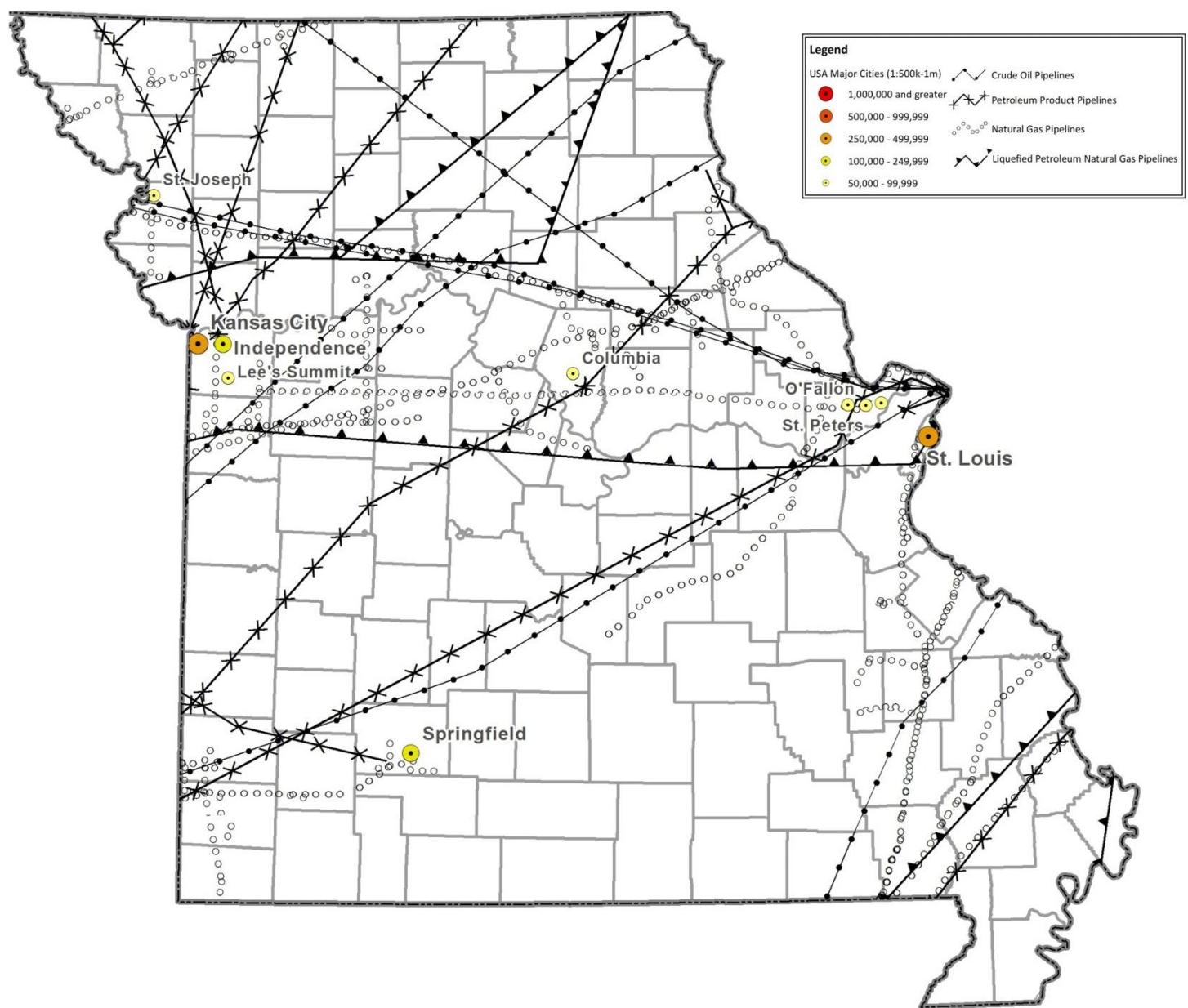
Pipeline

Approximately 10,700 miles of pipelines move natural gas, crude oil, and petroleum products throughout Missouri. The highest percentages of pipeline miles, according to the Missouri Incident and Mileage Overview authored by the Pipeline and Hazardous Materials Safety Administration (PHMSA), are in St. Charles County (4.9 percent), Cass County (3.6 percent), Audrain County (3.5 percent), and Johnson County (3.4 percent). These counties are located in the northern half of the State where the majority of major pipelines pass. **Figure 3-7** shows Missouri's major pipelines.

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Figure 3-7: Missouri Major Pipelines

Source: U.S. Energy Information Administration, MoDOT, and ESRI



Chapter 3 – Missouri Freight System

Intermodal Facilities

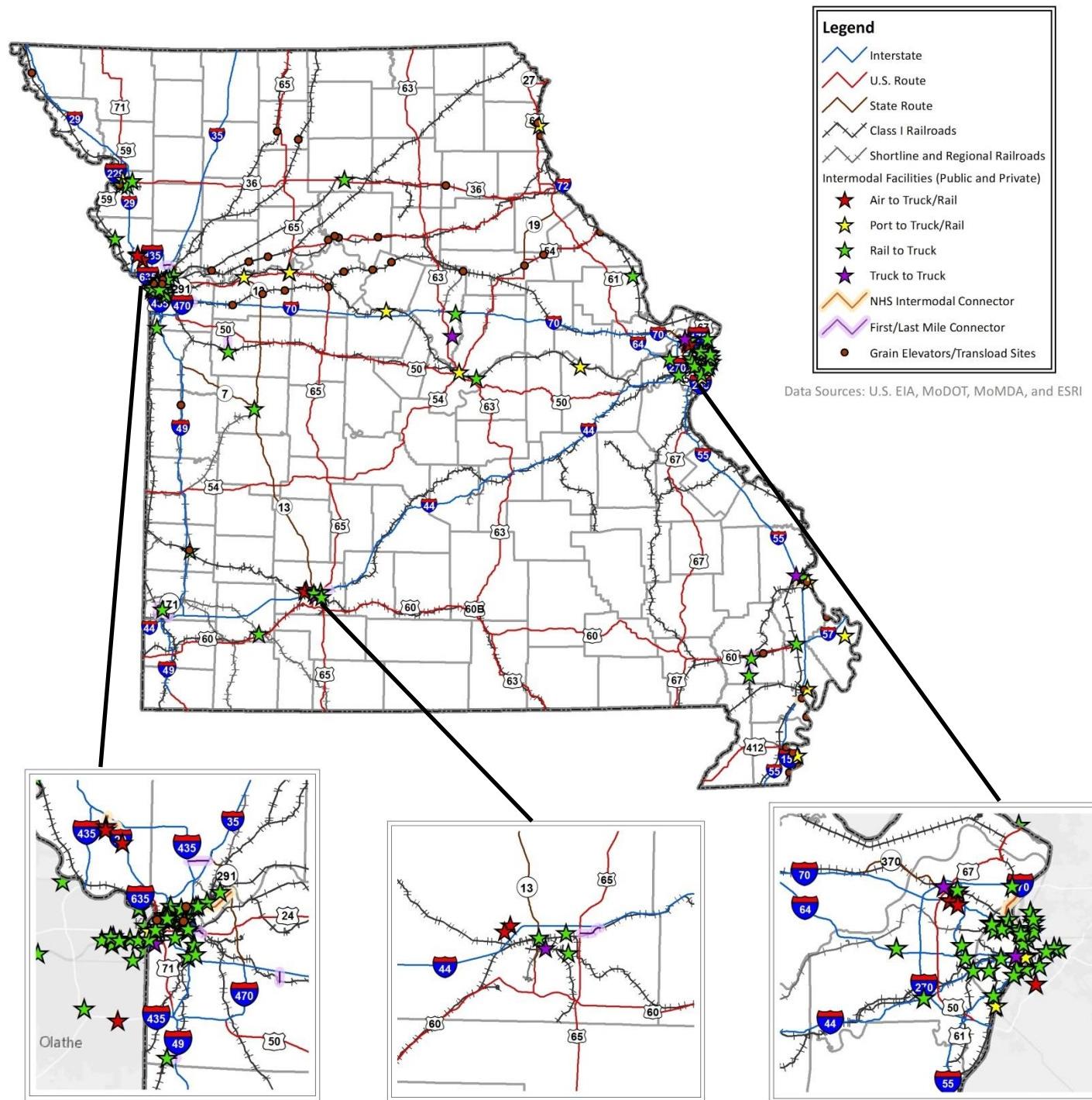
The National Transportation Atlas Data through the Bureau of Transportation Statistics identified 114 intermodal facilities located in Missouri. These facilities provide a variety of intermodal connections. The majority of the intermodal facilities (71 percent) accommodate transfers of commodities between rail and trucks. Other intermodal facilities offer transfers between rail/truck and ports (16 percent), rail/truck and airports (eight percent), or other modes (five percent).

The majority of intermodal activity occurs in metropolitan areas. The Kansas City area has 47 intermodal facilities and St. Louis has 30 intermodal facilities. Smaller clusters of intermodal facilities are in Springfield, which has six intermodal facilities, and St. Joseph, which has four intermodal facilities. The remaining 28 intermodal facilities are dispersed throughout the State. **Figure 3-8** shows Missouri's Intermodal Facilities.

Most, if not all, intermodal facilities are associated with private companies and offered as a service to customers. Intermodal facilities can affect the overall cost of logistics, increase efficiency, reduce congestion and burden on the highway system, and generate higher returns on public and private infrastructure investments. For these reasons, intermodal facilities can enhance Missouri's ability to compete domestically and internationally.

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Figure 3-8: Missouri Intermodal Facilities



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Kansas City region

Springfield region

St. Louis region

Source: U.S. EIA, MoDOT, and ESRI

Freight Generators

Freight generators create freight. Freight generators include distribution centers, warehouses, manufacturing facilities, and other origins and destinations.

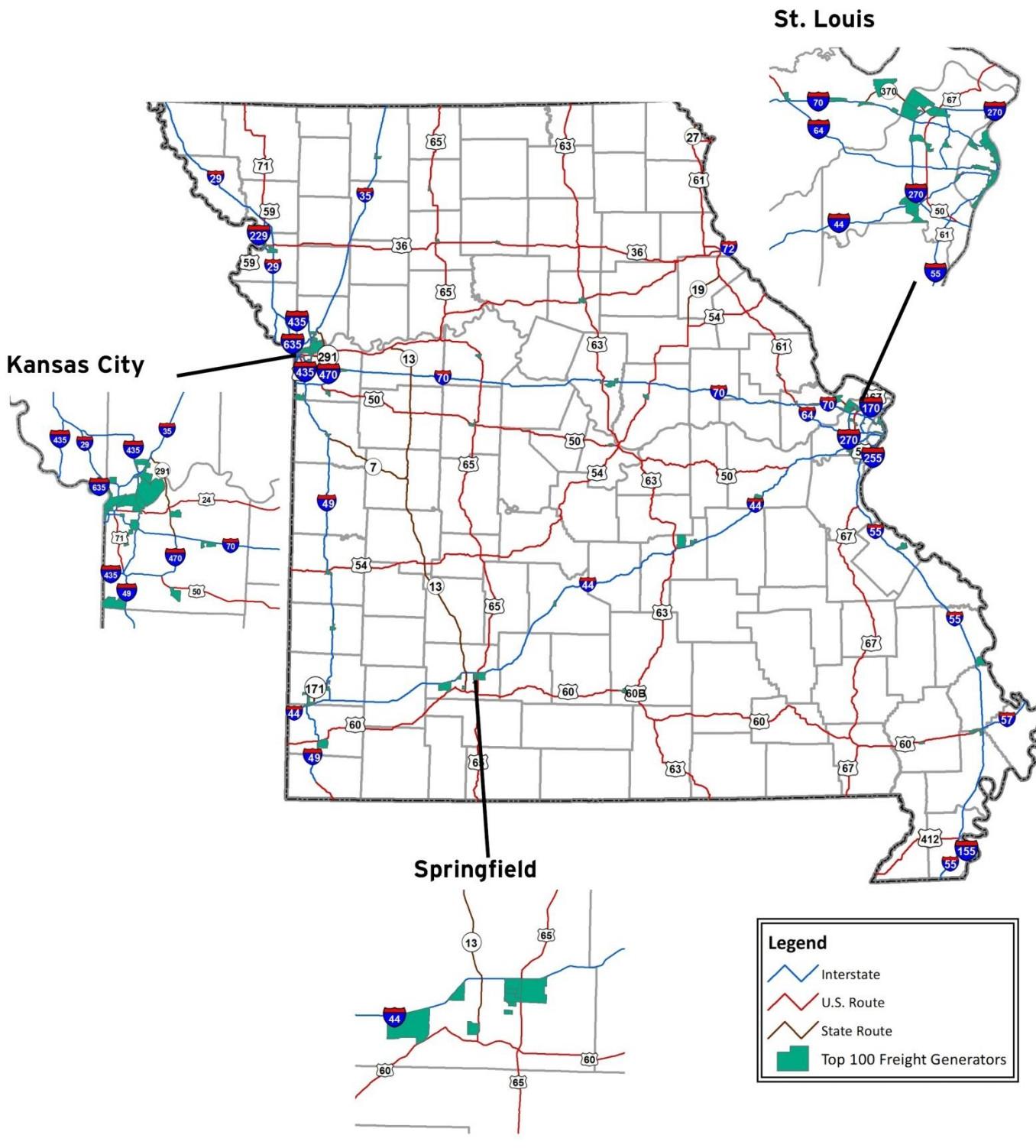
American Transportation Research Institute (ATRI) analyzed Global Positioning System (GPS) data from Missouri to identify census block groups where freight activity is most intense. The goal of the analysis was to identify geographic locations where freight is generated. These locations were identified based on the intensity of truck activity to, from, and within the census block group. The results of this analysis provide insight into the sources of freight movement.

Based on truck activity, the analysis identified 400 census block groups with significant freight movement, out of a total of 4,506 census block groups in the State. The 100 most intense freight generators were identified among the 400 census block groups. Note that the analysis included only stopped trucks and filtered out locations on major roadways or at truck stops. The full text of the ATRI *Missouri Freight Generators Analysis* is located in Appendix A-Attachment B.

The majority of key freight generators are located adjacent to (but not within the footprint of) major roadways. Urban areas such as St. Louis and Kansas City contain the largest share of freight generators, although several other freight generating locations were identified throughout the State. **Figure 3-9** depicts the 100 Missouri freight generators identified through this analysis. Each of the 100 locations is shown in green.

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Figure 3-9: Missouri Top 100 Freight Generators



Source: MoDOT, ESRI, and ATRI

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Freight Flows

More than one billion tons of freight crosses Missouri's infrastructure annually. Volumes of freight (especially compared to the capacity of the Missouri freight system), values of freight and related economic impacts, and public perception regarding freight movement are important considerations in the development of the Missouri State Freight Plan. **Table 3-1** shows the flow of freight in Missouri by freight tonnage and value by transportation mode and relative direction.

Table 3-1: Missouri Flow of Freight (2011)

Direction	Air	Pipe	Rail	Truck	Water	Total
Tons						
Outbound	34,313	#N/A	21,510,433	75,301,621	19,973,291	116,819,658
Inbound	38,249	932,258	92,326,793	89,250,507	5,093,847	187,641,654
Intrastate	370	#N/A	2,436,087	105,627,915	4,941,503	113,005,875
Through	71	7,412,827	341,805,597	230,212,488	19,850,043	599,281,026
Total	73,003	8,345,085	458,078,910	500,392,531	49,858,684	1,016,748,213
Value, in millions						
Outbound	\$7,620	#N/A	\$40,364	\$95,005	\$3,479	\$146,468
Inbound	\$3,656	\$643	\$39,647	\$119,731	\$3,083	\$166,760
Intrastate	\$100	#N/A	\$1,616	\$62,346	\$117	\$64,179
Through	\$10	\$5,117	\$383,409	\$433,794	\$5,870	\$828,200
Total	\$11,387	\$5,761	\$465,035	\$710,876	\$12,549	\$1,205,607

Source: Prepared by CDM Smith, based on TRANSEARCH® data for 2011

Truck Commodity Flows

In 2011, 40.6 million trucks in Missouri carried 500.4 million tons of freight valued at \$710.9 billion (see **Table 3-1**). On average, truck commodity movements are valued at \$1,421 per ton. More freight was moved by trucks than by any other transportation mode in Missouri in 2011—truck movements were 49.2 percent of freight movement by tonnage and 59.0 percent of freight movement by value. The major truck freight corridors include the major interstates (I-44, I-55, I-70, I-35, I-29, and I-49), as shown in **Figure 3-10** based on tonnage and **Figure 3-11** based on freight value. Additionally, major U.S. and State highways in the urban centers also accommodate significant freight movements (US-61 and I-49).

Chapter 3 – Missouri Freight System

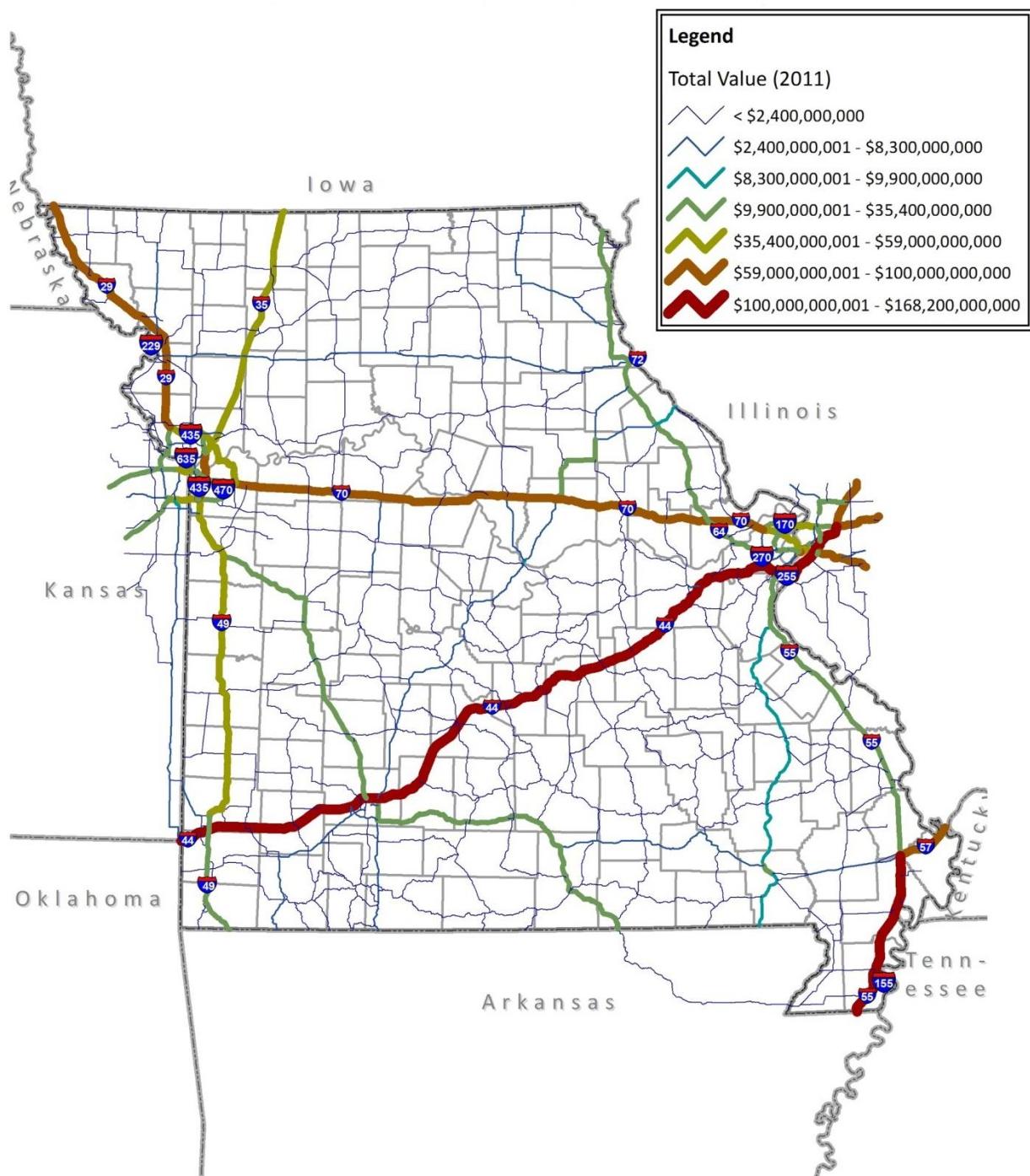
Figure 3-10: Total Tonnage of Freight Moved by Truck in Missouri (2011)



Source: MoDOT, ESRI, TRANSEARCH 2011, and CDM Smith

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Figure 3-11: Total Value of Freight Moved by Truck in Missouri (2011)



Source: MoDOT, ESRI, TRANSEARCH 2011, and CDM Smith

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Rail Commodity Flows

In 2011, 8.2 million rail cars carried 458.1 million tons of freight valued at \$465.0 billion (see Table 3-1). On average, total rail commodity movements are valued at \$1,015 per ton. Rail was the second most common way to move freight in Missouri in 2011—rail movements accounted for 45.1 percent of freight movement by tonnage and 38.6 percent of freight movement by value. Key rail freight corridors include routes served by the major Class I carriers, especially those surrounding Kansas City, as seen in **Figure 3-12** based on tonnage and **Figure 3-13** based on freight value. The routes carrying the most rail tonnage include the Union Pacific line between Kansas City and St. Louis and the Burlington Northern-Santa Fe lines between Kansas City and Chicago and between Kansas City and Wyoming (via Nebraska).

Table 3-2: Missouri Railroad Abbreviations, Routes and Classes

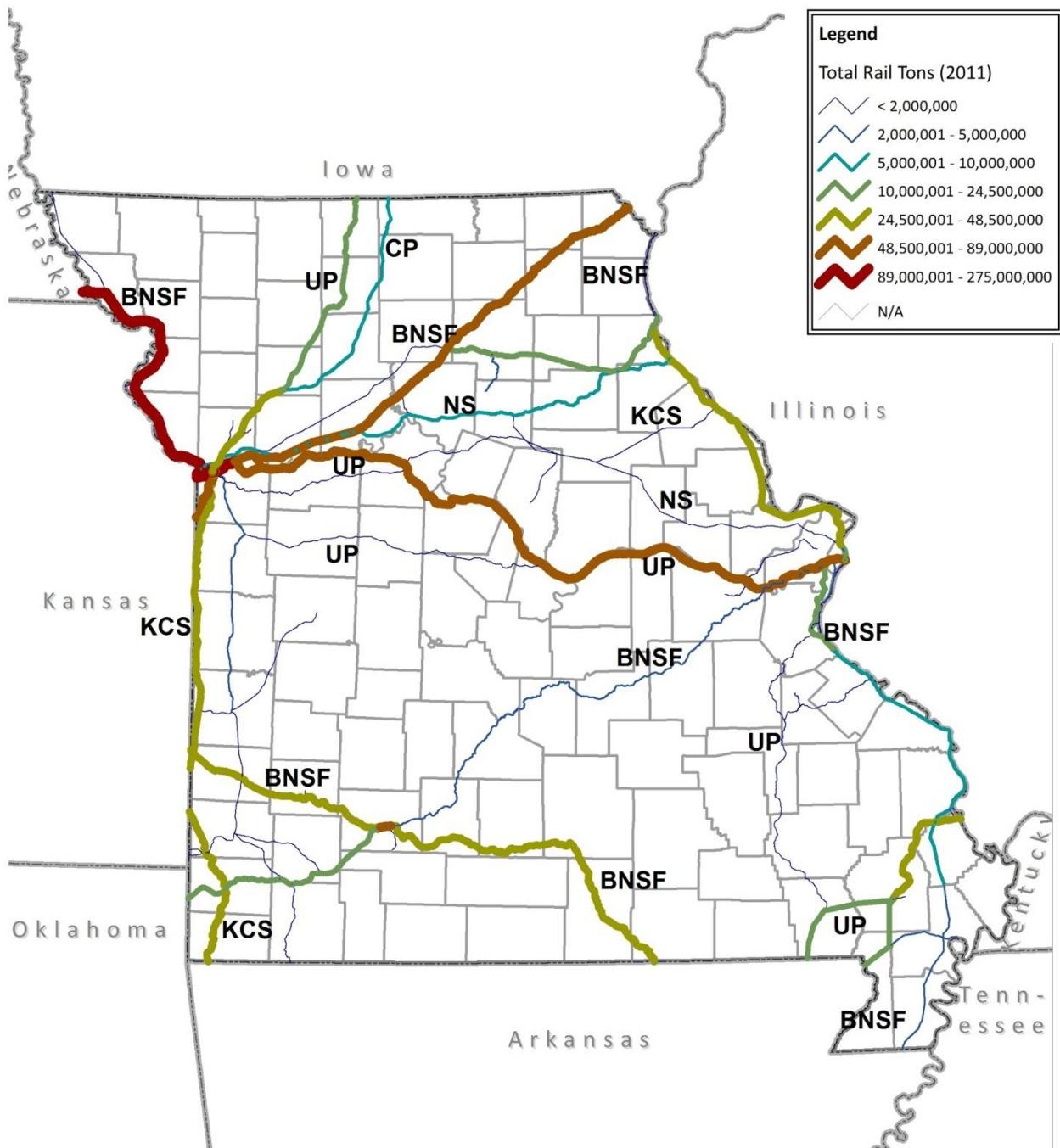
Class	Abbreviation	Route
Class 1	BNSF	Burlington Northern Santa Fe
Class 1	CSX	CSX Transportation
Class 1	KCS	Kansas City Southern Railway
Class 1	NS	Norfolk Southern Railway
Class 1	CP	Soo Line Corporation (U.S. operating arm of Canadian Pacific)
Class 1	UP	Union Pacific Railroad
Switching and Terminal Railroads	CMR	Central Midland Railway
Switching and Terminal Railroads	(COLT)	Columbia Terminal
Switching and Terminal Railroads	KCT	Kansas City Terminal Railway Company
Switching and Terminal Railroads	MRS	Manufacturers Railway Company
Switching and Terminal Railroads	MVP	Missouri & Valley Park Railroad
Switching and Terminal Railroads	MNC	Missouri North Central Railroad
Switching and Terminal	(SE)	Semo Port Railroad

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Railroads		
Switching and Terminal Railroads	TRRA	Terminal Railroad Association of St. Louis
Short Line Railroads	AM	Arkansas & Missouri Railroad
Short Line Railroads	KAW	Kaw River Railroad
Short Line Railroads	MNA	Missouri & Northern Arkansas Railroad
Short Line Railroads	OVRR	Ozark Valley Railroad
Short Line Railroads	SKOL	South Kansas & Oklahoma Railroad

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Figure 3-12: Total Tonnage of Freight Moved by Rail in Missouri (2011)



Source: MoDOT, ESRI, TRANSEARCH 2011, and CDM Smith

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Figure 3-13: Total Value of Freight Moved by Rail in Missouri (2011)



Source: MoDOT, ESRI, TRANSEARCH 2011, and CDM Smith

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Source: MoDOT, ESRI, TRANSEARCH 2011, and CDM Smith

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Waterway and Ports Commodity Flows

In 2011, Missouri ports (waterborne) carried 49.9 million tons of freight valued at \$12.5 billion (**Table 3-1**). On average, total port commodity movements are valued at \$252 per ton. Port movements were 4.9 percent of freight movement by tonnage and 1.0 percent of freight movement by value in Missouri in 2011, a small proportion relative to the dominant truck and rail modes.

Air Commodity Flows

In 2011, Missouri air cargo was 73,003 tons valued at \$11.4 billion (**Table 3-1**). On average, total air cargo movements are valued at \$155,974 per ton. Air cargo movements were less than 0.01 percent of freight movement by tonnage and less than 1.0 percent of freight movement by value in Missouri in 2011, a very small proportion relative to other modes.

Pipeline Commodity Flows

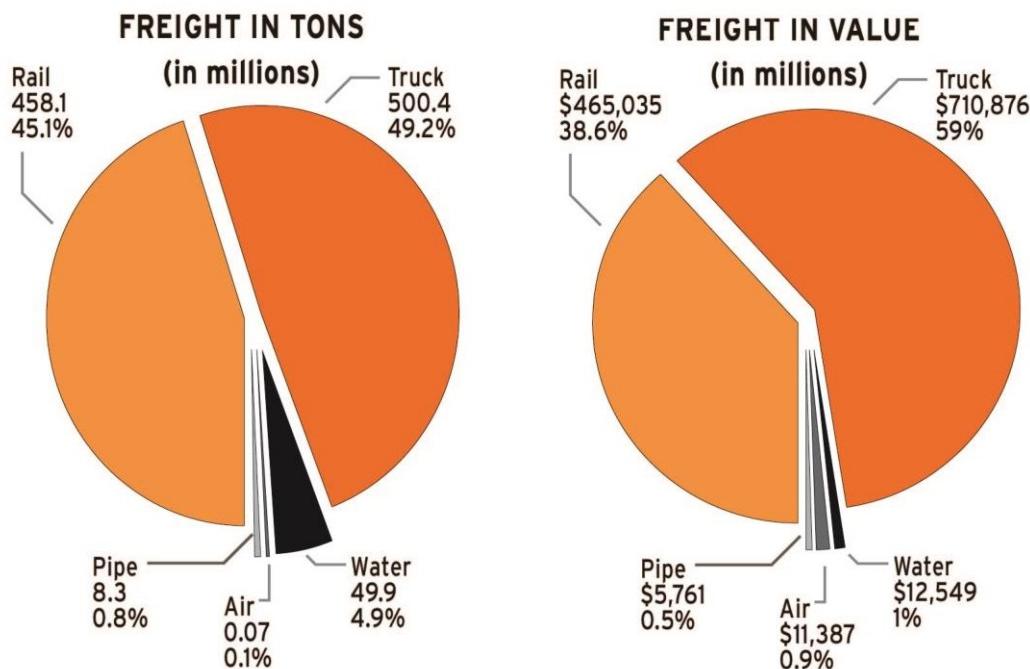
In 2011, Missouri pipelines moved 8.3 million tons of freight valued at \$5.8 billion (**Table 3-1**). On average, total pipeline commodity movements are valued at \$690 per ton. Pipelines movements were less than one percent of freight movements by tonnage and 0.5 percent of freight movements by value in Missouri in 2011, also a small proportion relative to the dominant truck and rail modes.

Freight Flow Summary

Data indicates that Missouri is a bridge state. This means that the majority of movements traversing Missouri's transportation network is truck- and rail-based through traffic. The main commodities are rail-based coal and truck-based secondary traffic. Secondary traffic is the movement of goods from a distribution source (i.e. warehouse). The goods at the distribution source had previously been transported to the facility by truck or another freight transportation mode. Truck transports the largest relative volume and value of freight relative to the other transportation modes, followed closely by rail (**Figure 3-14**).

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Figure 3-14: Freight Movement by Tonnage and Value per Mode (2011)



Source: Prepared by CDM Smith, based on TRANSEARCH® data for 2011

Missouri Freight Network

The *Moving Ahead for Progress in the 21st Century Act* (MAP-21) directed the U.S. DOT to establish a national freight network to assist states in strategically directing resources toward improved system performance for efficient movement of freight on the highway portion of the nation's freight transportation system. In response to MAP-21, the Freight Plan developed the Missouri Freight Network of highway, freight rail, air cargo, and inland waterways.

This Missouri Freight Network is important and will be used in a number of ways:

- The network is one of the criteria used in the projects prioritization process for this Missouri State Freight Plan. A project would need to be a freight network Tier 1, 2, or 3 route or be an immediate connection (i.e. within one mile or an agreed-upon range).
- The network can help prioritize future freight projects beyond those identified in the Missouri State Freight Plan.
- The network includes the Primary Freight Network, designated by U.S. DOT and key rural freight routes which will be part of Missouri's Critical Rural Freight Network.

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Freight Data Analysis

The first step in developing the Missouri Freight Network was compiling and analyzing data from several sources, including existing internal MoDOT data. Data included:

- TRANSEARCH 2011 data
- ATRI – freight generators via truck
- Truck volumes
- Other network maps
- Modal data – rail, ports, airports, and intermodal facilities

Along with the above data, specific criteria were used to determine the proposed facilities for each mode. These criteria were established based on best practices from across the county and based on what is most relevant to Missouri.

Highways

The Missouri Freight Network includes the Missouri major and minor highway system. Segments of these highways are classified by a tiered approach, which includes four classes of importance (Tiers 1 through 4). The primary criterion for classification is the amount of freight tonnage. All the interstates and particular U.S. and State routes are Tier 1, Tier 2, or Tier 3. The remaining routes in the network are Tier 4, and they impact freight in some way. For example, Tier 4 includes the lettered routes that are important for the movement of farm-to-market goods.

Below are the criteria for classifying the Tier 1, Tier 2, and Tier 3 highway segments.

- Interstate
 - Identified on the National Freight Network
 - Identified on the Missouri Major Road System
 - Federal Truck Route designation
 - Truck tonnage of over one million for a section or all of the route and/or at least 5,000 trucks per day for a section of the route
 - Connectivity to freight generators and/or intermodal facilities
- U.S. and State Routes
 - Identified on the Missouri Major Road System
 - Federal/State Truck Route designation
 - Truck tonnage of over one million for a section or all of the route and/or at least 2,500 trucks per day for a section of the route
 - Connectivity to freight generators and/or intermodal facilities

Figure 3-15 shows the proposed highway network with segments by freight class.

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Freight Rail

Freight railroads in Missouri are grouped into several categories: Class I, Switching and Terminal, and Class III (Short Line) railroads. A total of 19 railroads operate within the State:

- **Class I Railroads** – Burlington Northern Santa Fe (BNSF), CSX Transportation (CSX), Kansas City Southern Railway (KCS), Norfolk Southern Railway (NS), Soo Line Corporation (CP - U.S. operating arm of Canadian Pacific), and Union Pacific Railroad (UP)
- **Switching and Terminal Railroads** – Central Midland Railway (CMR), Columbia Terminal (COLT), Kansas City Terminal Railway Company (KCT), Manufacturers Railway Company (MRS), Missouri & Valley Park Railroad (MVP), Missouri North Central Railroad (MNC), Semo Port Railroad (SE), and Terminal Railroad Association of St. Louis (TRRA)
- **Short Line Railroads** – Arkansas & Missouri Railroad (AM), Kaw River Railroad (KAW), Missouri & Northern Arkansas Railroad (MNA), Ozark Valley Railroad (OVRR), and South Kansas & Oklahoma Railroad (SKOL)

Figure 3-15 shows the proposed freight rail network.

Air Cargo

The Missouri Freight Network includes airports that report the movement of cargo to the Air Carrier Activity Information System. These airports are:

- Kansas City International Airport (MCI)
- Lambert-St. Louis International Airport (STL)
- Springfield-Branson National Airport (SGF)

Airports selected on the Missouri Freight Network are classified as either primary or secondary. A primary airport has domestic and international air cargo routes. A secondary airport offers only domestic air cargo routes. Figure 3-15 shows the airports by class.

Inland Waterways

The Missouri Freight Network includes inland waterways with a public port authority along the Missouri or Mississippi Rivers. The 14 public water port authorities in Missouri are:

- City of St. Louis
- Howard/Cooper County Regional
- Jefferson County
- Kansas City
- Lewis County-Canton
- Marion County
- Mississippi County
- New Bourbon Regional
- New Madrid County
- Pemiscot County
- Pike/Lincoln County
- Southeast Missouri Regional
- St. Joseph
- St. Louis County

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Ports selected for inclusion in the Missouri Freight Network are classified as either active or developing. Active means that a port has the ability to ship freight. Developing means that a port does not have the ability to ship freight. **Figure 3-15** shows the ports by class.

NHS Intermodal Connectors and First and Last Mile Connectors

The Missouri Freight Network incorporates the National Highway System (NHS) freight intermodal connectors and first and last mile connectors. NHS intermodal connectors are designated public roads identified by the state departments of transportation and metropolitan planning organizations because the roads connect major intermodal terminals to the Missouri Freight Network. The final designations are approved by the U.S. DOT. In Missouri, there are 15 NHS intermodal connectors. These are critical components of the freight system and important conduits for the timely and reliable delivery of goods and services.

The function of first/last mile connectors is similar to NHS intermodal connectors; however, they are not approved by the USDOT. During the development of the Freight Plan, 11 first and last mile connectors were identified by evaluating the locations of the top 100 freight generators and intermodal facilities in Missouri. **Table 3-3** shows the first/last mile connectors.

Table 3-3: First/Last Mile Connectors in Missouri

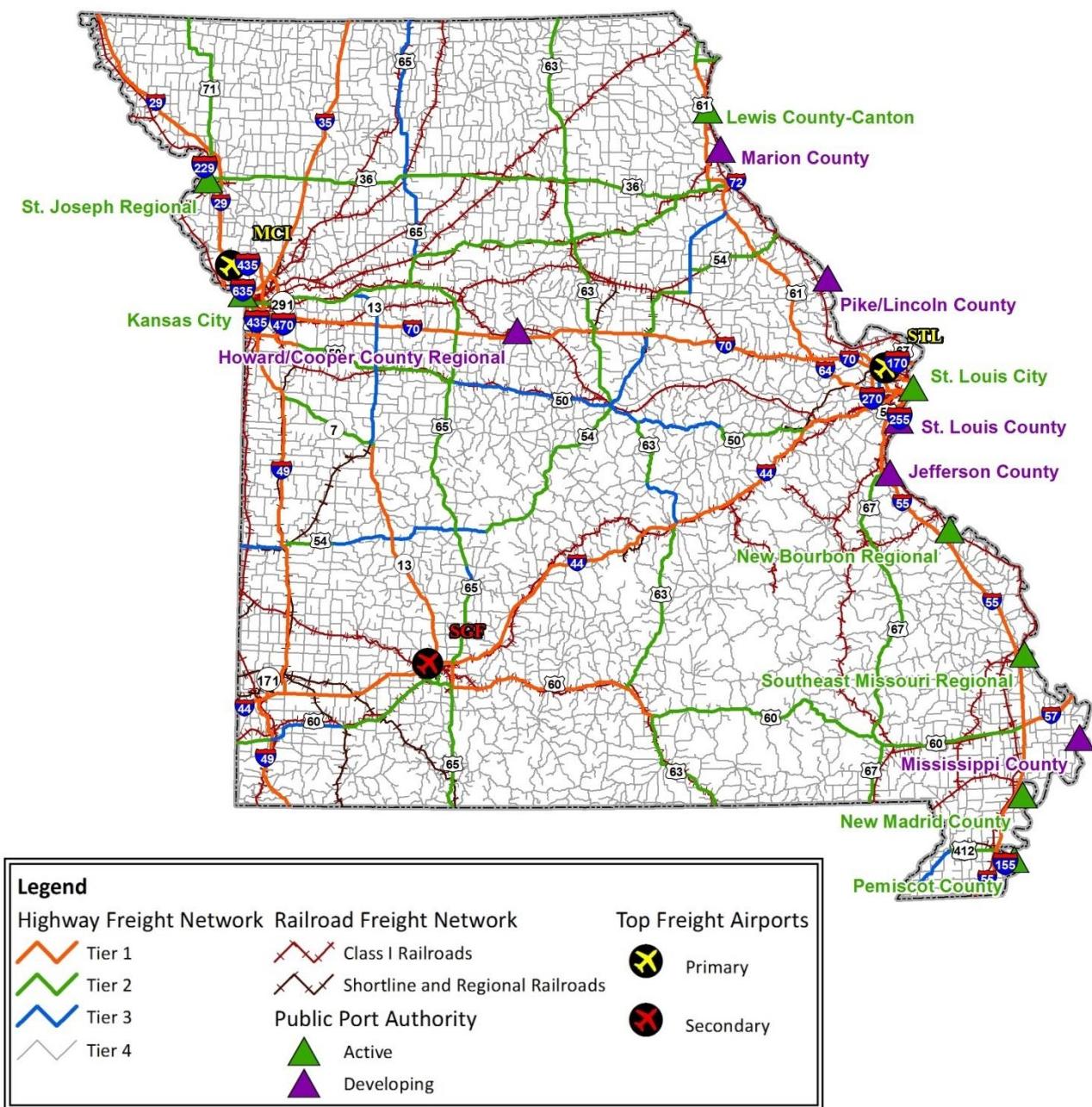
Route	Limits
US-24	I-435 to Winner Road
MO-7	I-70 to US-40
MO-25	US-60 to RT-U/Z
MO-39	US-60 to Olive Street
MO-43	MO-171 to MO-66
MO-131	US-50 to MO-58
MO-150	I-49 to Thunderbird Road
MO-152	I-35 to I-435
MO-171	MO-171/249 to MO-43
MO-744	US-65 to Mulroy Road
LP-49	MO-171 to I-44

Data Source: CDM Smith

The proposed freight network is discussed in further detail in Appendix A: Assets and Freight Flow.

Chapter 3 – Missouri Freight System

Figure 3-15: Missouri Freight Network



Source: MoDOT, ESRI, TRANSEARCH 2011, and CDM Smith

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Figure 3-16: Missouri Freight Network-Kansas City

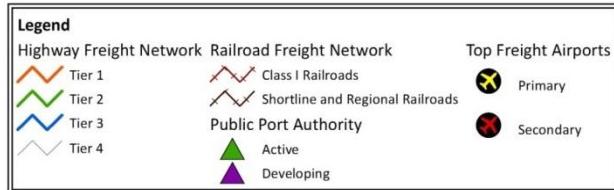


Figure 3-17: Missouri Freight Network-St. Louis



Figure 3-18: Missouri Freight Network-Springfield



Source: MoDOT, ESRI, TRANSEARCH 2011, and CDM Smith

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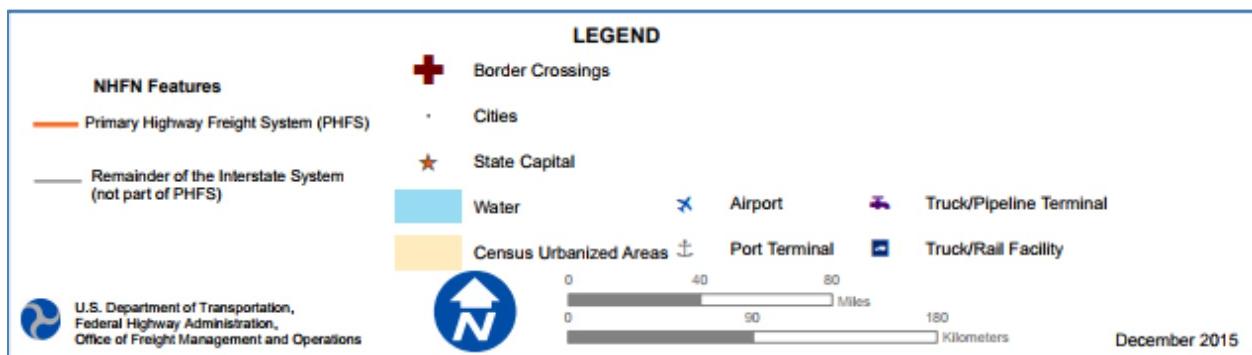


Figure 3-19: National Primary Highway Freight Network

Chapter 4 - Freight Network Condition and Performance

KEY POINTS

- While Missouri has improved the freight system in recent years, aging infrastructure is affecting all freight modes.
- Funding for maintenance and improvements is an on-going concern.
- The condition and performance of various components of the existing freight network provides important data to assess the current and future needs of the system and prioritize future investments.

Introduction

In recent years, Missouri has made improvements to the freight system, and these improvements have enhanced freight network condition and performance. However, aging infrastructure is affecting all of the freight modes and funding for maintenance and improvements will continue to be a concern. Accurately identifying the Missouri Freight Network's current condition and performance helps assess the need for improvements to the freight system.

Performance measures are used across the transportation industry to evaluate transportation systems and agencies. The Missouri Department of Transportation's (MoDOT's) rich history in performance measurement and management is best exemplified by Tracker, MoDOT's quarterly performance measure publication. Tracker, mode-specific measures, and national performance measures were used to help develop this Missouri State Freight Plan.

Highway

Missouri has the seventh largest state highway system in the United States. It is made up of approximately 33,700 centerline miles of roadway, 5,500 miles of which are classified as heavily traveled "major highways" and 28,200 miles of which are defined as lesser traveled "minor highways." Missouri's major highways include just 20 percent of the State highway miles, but carry 80 percent of the State

Chapter 4 – Freight Network Condition and Performance

highway traffic. The more than 10,000 bridges that cross rivers, other highways, and valleys are also important elements of the highway system.

Highway and Bridge Condition and Performance

The major highways include busy routes in urban areas, particularly where vehicles travel between business districts and residential areas. Overall, most major highways in Missouri are in good condition, as shown in **Figure 4-1**. MoDOT has established a target rate of greater than 85 percent for this measure, which has been exceeded each year for the past five years.



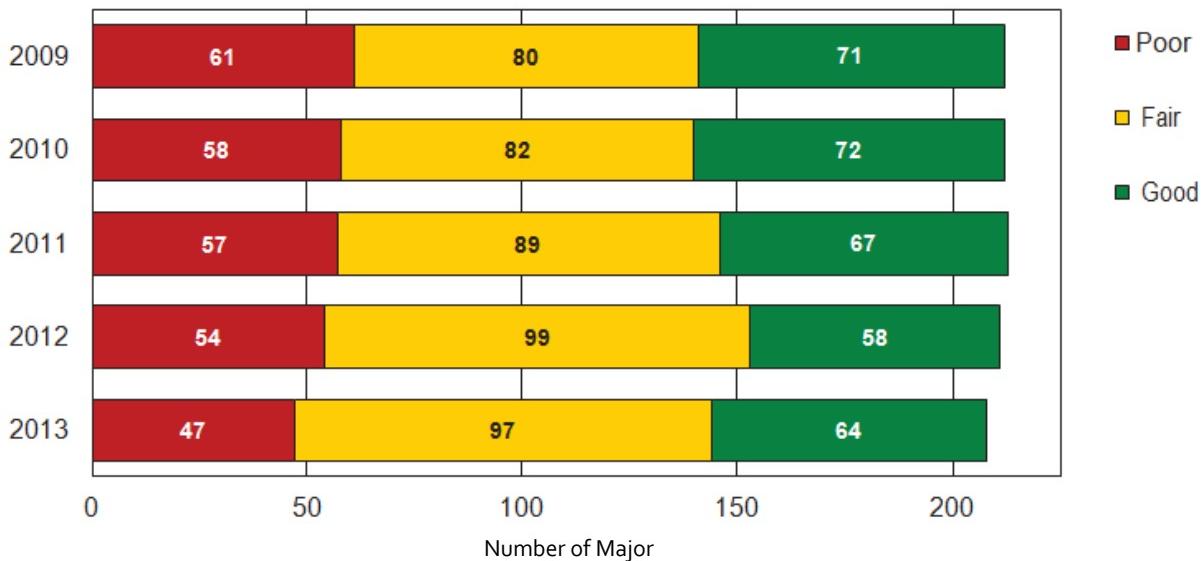
Source: MoDOT Tracker, July 2014 edition

Missouri has 208 major bridges that cross large rivers and lakes and are longer than 1,000 feet. These bridges can be classified as in good, fair, or poor condition. Significant investment in Missouri's major bridges resulted in a decreased number of structures falling into the poor category, but the number of structures classified in the good category also decreased.

Major bridges are very expensive to rehabilitate and replace. A simple rehabilitation typically costs over \$10 million, while major bridge replacements can exceed hundreds of millions of dollars. The 2013 Missouri major bridge conditions are shown in **Figure 4-2**.

Chapter 4 – Freight Network Condition and Performance

Figure 4-2: Condition of Major Bridges in Missouri (208 Total Bridges)



Source: MoDOT Tracker, July 2014 edition

MoDOT tracks the percentage of structurally deficient deck area for bridges that are part of the National Highway System (NHS). The *Fixing America's Surface Transportation (FAST) Act* requires that states track this measure, with a target of less than 10 percent. Missouri is meeting this target with only 7.0 percent of structurally deficient deck areas on NHS bridges.

Structurally deficient means there is a need for significant maintenance, rehabilitation, or replacement.

Low vertical clearances at overpasses can restrict truck traffic on highways. There are 73 low vertical clearance bridges in Missouri. This is less than one percent of all bridges in the State. None of these low clearance bridges cross interstates, but four (5 percent) of these bridges cross U.S. highways in Missouri.

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Low clearance bridges have a height restriction less than the standard 16 feet, 6 inches. In Missouri, the minimum clearance is 14 feet.

In addition to the 73 low clearance bridges, 4,849 load-restricted bridges can restrict truck traffic on highways in Missouri. These load-restricted bridges are about 20 percent of all bridges in the State. A total of 135 (three percent) of these bridges cross interstates, and 81 (2 percent) cross U.S. highways. A total of 44 of these load-restricted bridges are also low clearance bridges.

Load restriction means the bridge is only capable of safely supporting loads less than the posted or standard load weight of 80,000 pounds maximum.

Truck Bottlenecks

ATRI's (American Transportation Research Institute) Freight Performance Measures (FPM) database compiles anonymous trucking operations data from several hundred thousand trucks using Global Positioning System (GPS) data from onboard trucking systems, generating billions of data points annually. The truck GPS data gives an average speed and numerous position counts for every hour of the day based on where the trucks traveled across the 3,311 road segments in Missouri.

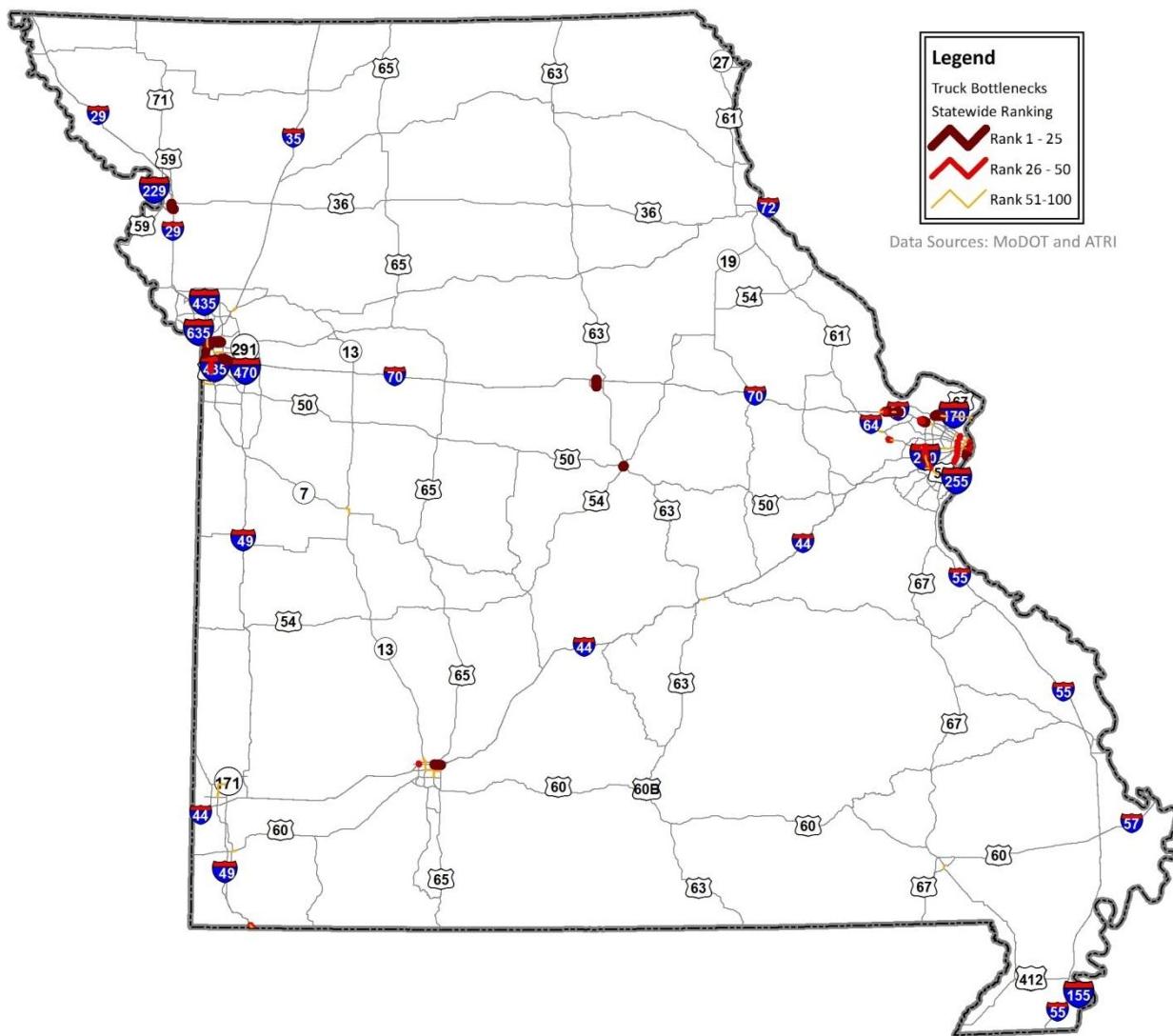
Peak travel times occur in the morning, midday, and evening. Using the ATRI data, the truck travel times per mile were calculated for these three periods and were then added together to calculate a total congestion index. Highway segments with highest total congestion indices reflect the most congested trucking bottlenecks in Missouri.

The 100 segments with the highest total congestion indices were selected for further analysis. St. Louis and Kansas City contained 81 out of the State's 100 most congested truck bottlenecks; however, Springfield also contained several bottlenecks. The remaining bottlenecks were dispersed throughout cities and towns across the State. The 100 most congested trucking bottlenecks are shown on **Figure 4-3**. Further trucking bottleneck details are in Appendix A.

A bottleneck is a section of road where movement of traffic is limited by the road design. This is often a section of road with a fewer number of lanes, a sharp curve, or access points where traffic is entering or exiting the road. A bottleneck is the most vulnerable point for congestion in a road network and is also referred to as a chokepoint.

Chapter 4 – Freight Network Condition and Performance

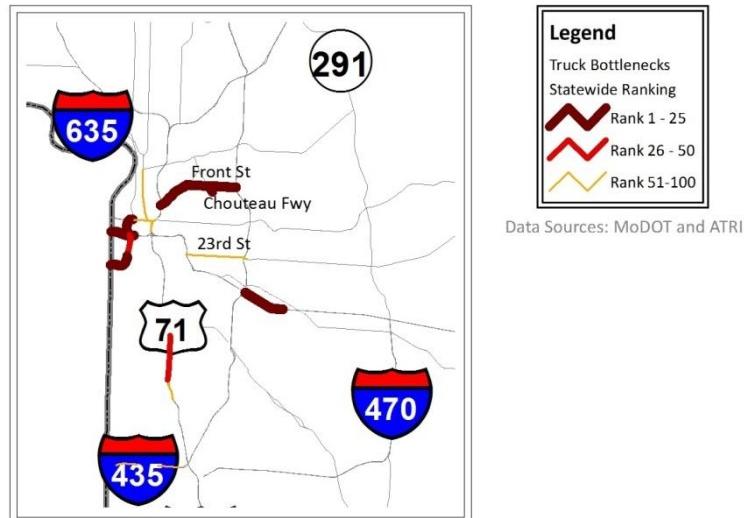
Figure 4-3: 100 Most Congested Trucking Bottlenecks in Missouri



Source: CDM Smith, ATRI, ESRI

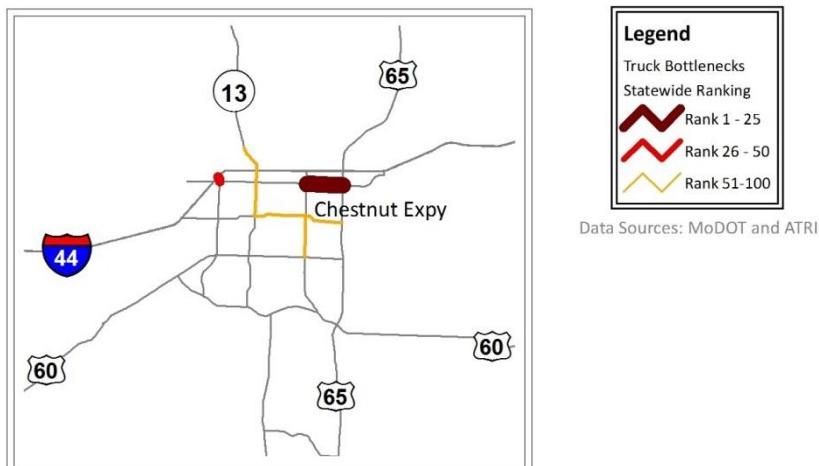
Chapter 4 – Freight Network Condition and Performance

Figure 4-3, a: Most Congested Trucking Bottlenecks in Kansas City



Source: CDM Smith, ATRI, ESRI

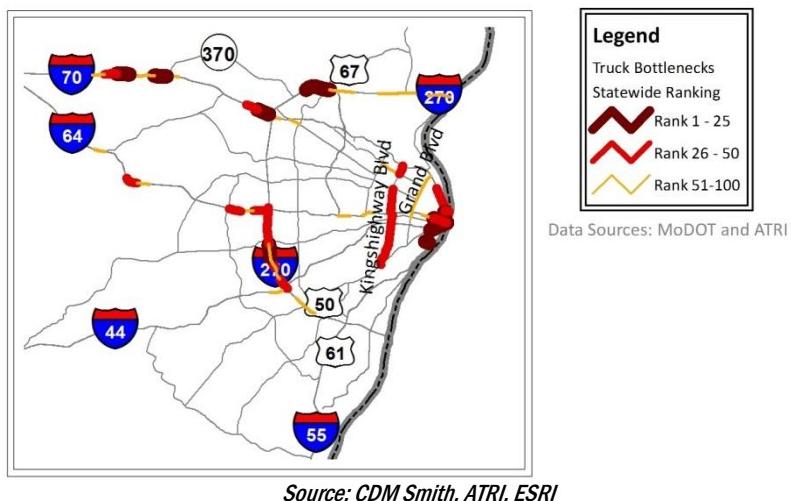
Figure 4-3, b: Most Congested Trucking Bottlenecks in Springfield



Source: CDM Smith, ATRI, ESRI

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Figure 4-3, c: Most Congested Trucking Bottlenecks in St. Louis



Source: CDM Smith, ATRI, ESRI

Highway Safety

A three-year crash rate (2010-2012) was calculated for highway segments proposed for the Missouri Freight Network. Crash rates were calculated for both directions for each highway segment. The three highway segments with the largest Commercial Motor Vehicle (CMV) crash rates are shown in **Table 4-1**.

Table 4-1: Highway Segments with the Largest Commercial Motor Vehicle Crash Rates in Missouri

Interstate Segment	Direction	To	From
I-55	North	I-44	I-70
I-55	South	I-70	I-44
I-29	South	I-435 (north)	I-35 split

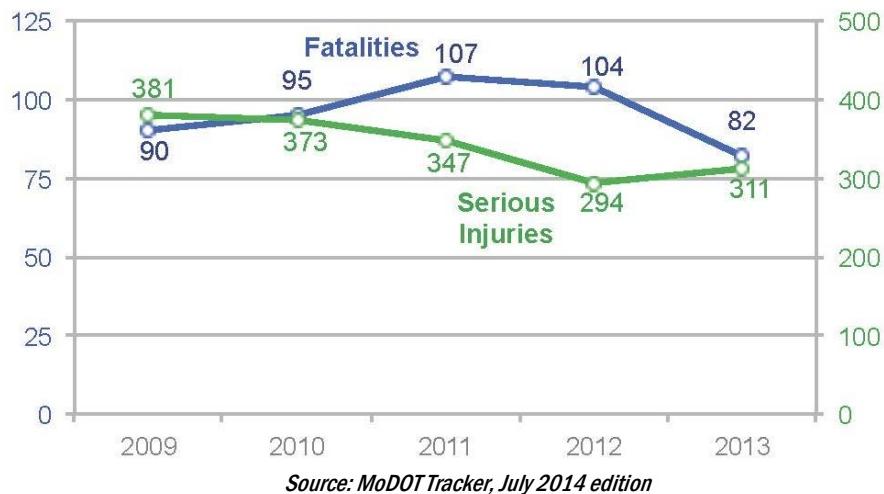
US/MO Route Segment	Direction	To	From
MO 13	South	I-44	US 60
MO 210	East	I-435	MO 291
MO 13	North	US 60	I-44

Source: CDM Smith, 2010-2012

The number of commercial vehicle crashes that resulted in fatalities and serious injuries during the 2009-2013 time period is shown in **Figure 4-4**. MoDOT uses this information to target educational, enforcement, and safety improvement features. Both the rates of fatalities and serious injuries decreased between 2009 and 2013.

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Figure 4-4: Number of Commercial Vehicle Crashes Resulting in Fatalities and Serious Injuries in Missouri



Truck Freight Performance

In 2011, the Missouri highway freight system supported over 40.6 million truck trips carrying more than 500.4 million tons valued at \$710.9 billion. The top five truck commodities by tonnage, units, value, and growth are provided in Appendix A. In addition, Chapter 6 of this plan highlights the truck hours of delay and reliability index on key Missouri interstates.

Freight Generators

ATRI's Freight Performance Measures (FPM) database was also used to identify where most freight activity occurs in Missouri. A detailed analysis of this data identified the 100 most intense freight generators in Missouri. The analysis found that the majority of key freight generators were located along major roadways. Furthermore, urban areas such as St. Louis and Kansas City contained the greatest share of freight generators, although several other notable freight-generating locations were identified throughout the State. The top 100 freight generators are shown in **Figure 3-9** in Chapter 3.

Rail

The State of Missouri has significant freight rail infrastructure with six Class I freight railroads currently in operation of 4,218 miles of main track rail lines, 2,500 rail yard track miles, and approximately 5,697 public and private rail-highway crossings within the State. There are no Class II railroads operating in Missouri; however, five short line railroads serve Missouri. These short line systems include 426 track

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miles, ranging from 33 to 331 track miles per operator. **Figure 3-3** in Chapter 3 displays the rail lines and ownership in Missouri.

Rail Condition and Performance

Railroads are categorized as Class I, II, or III depending on operating revenues. In 2012 dollars, a railroad with operating revenues greater than \$433.2¹ million for at least three consecutive years is a Class I railroad. A railroad with revenues greater than \$34.7 million but less than \$433.2 million is a Class II railroad, commonly referred to as a “regional” railroad. A railroad not within the Class I or II categories is considered a Class III railroad, also known as a “short line.”

Railroads provide important connections to water ports and intermodal terminals. In Missouri, there are five Missouri water ports that have direct rail access and eight National Highway System Designated (NHS) Truck/Rail Intermodal Facilities in Missouri.

The National Rail Freight Infrastructure Capacity and Investment Study, prepared by the Association of American Railroads (AAR), developed a methodology for determining the level of service (LOS) for a specific freight rail corridor. The basis for determining the level of congestion on a rail corridor is a calculated volume-to-capacity (V/C) ratio. For Missouri, rail capacity assessments considered three factors: ratio of the number daily trains to the number of tracks, train control system, and train type. See **Figure 4-5**.

The 2012 Missouri State Rail Plan provides LOS based on rail line V/C ratios for railroads operating in Missouri.² Some of this LOS data may have changed since 2012 due to changes in the economy and demand of specific goods. Regardless, it appears that some rail lines will be reaching or exceeding capacity. The rail lines that should be monitored for potential capacity concerns are:

- BNSF –Thayer North Sub (from Springfield to Arkansas state line to south)
- BNSF – St. Joseph Sub (from Kansas City to Nebraska state line to northwest)
- UP – Chester Sub (from Dexter to Illinois state line to east)
- UP – Hoxie Sub (from Dexter to Arkansas state line to south)
- UP – Sedalia Sub (from Jefferson City to Kansas City)
- NS – Kansas City District (from Moberly to Kansas City)
- KCT – Kansas City (from I-435 to Kansas state line to west)

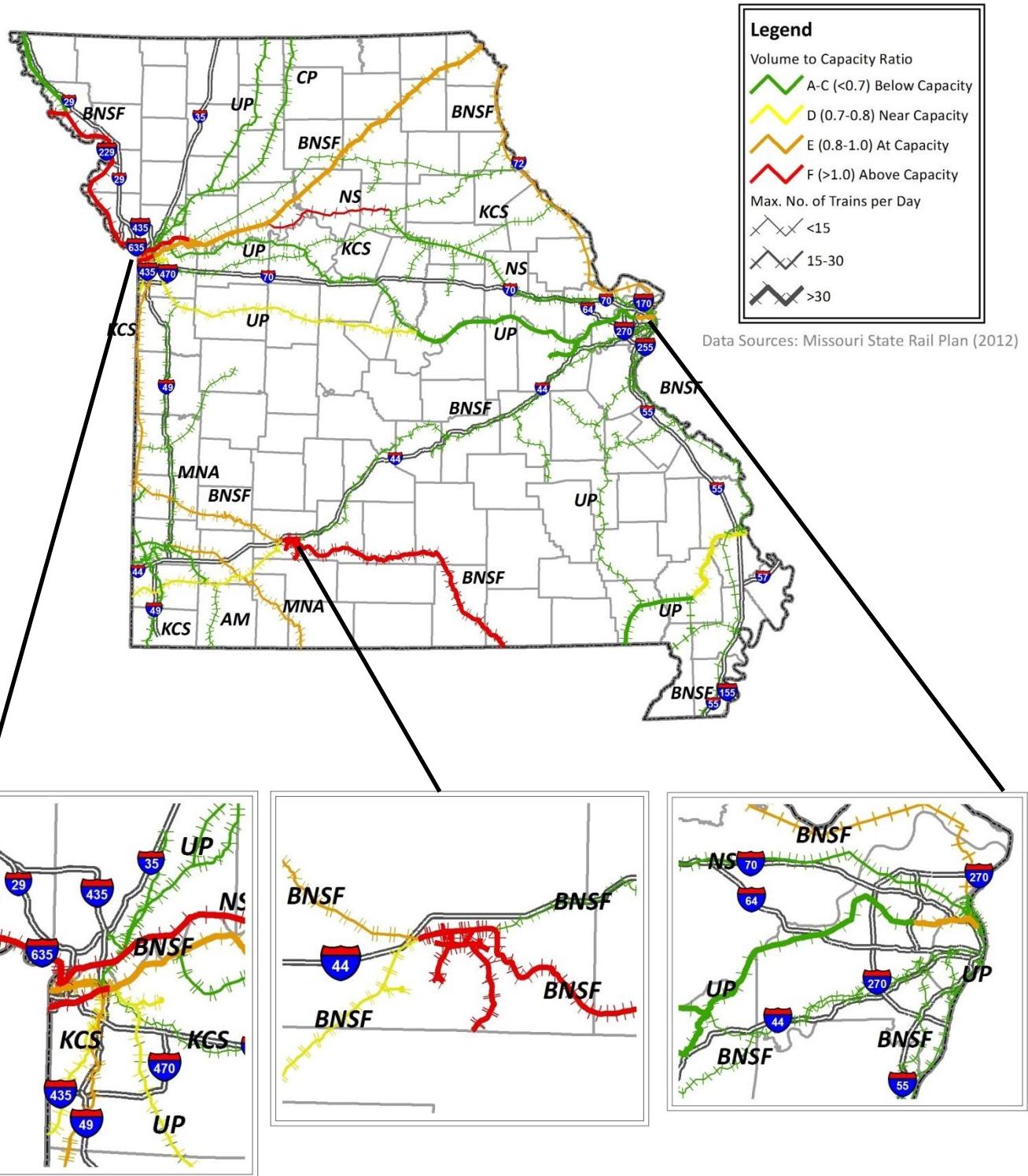
Level of service (LOS) is a measure by which transportation planners determine the quality of service on a given facility. The transportation LOS system uses the letters A through F, with A being uncongested and F being extremely congested.

¹ http://www.aslrra.org/about_aslrra/faqs/

² Missouri State Rail Plan, MoDOT, 2012

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Figure 4-5: Rail Corridor Volume Capacity

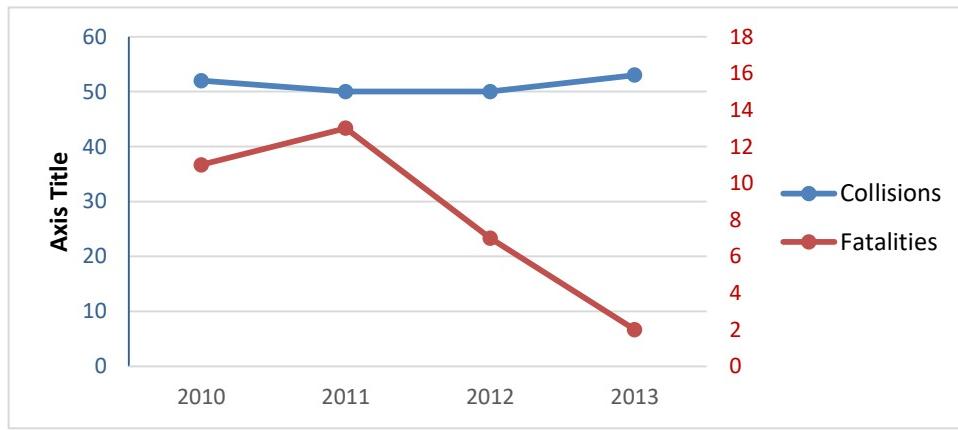


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Rail Safety

The number of train-vehicle collisions and fatalities at public railroad crossings in Missouri are shown in **Figure 4-6**. This data drives the development and focus of a portion of the Missouri Highway Safety Plan. Although the number of collisions has remained relatively constant, the number of fatalities dropped between 2011 and 2013.

Figure 4-6: Number of Highway-Rail Crossing Collisions and Fatalities in Missouri



Source: <http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/>

Rail Freight

With the given condition and performance of the rail system in Missouri, 8.2 million rail cars carried 458.1 million tons of freight valued at \$465.0 billion in 2011. Freight transport through the Missouri rail network increased most on the BNSF line connecting Kansas City and Chicago. The top five rail commodities by tonnage, units, value, and growth are provided in Appendix A.

Waterway

The State of Missouri contains 1,050 miles of navigable rivers, including 500 miles of the Mississippi River and 550 miles of the Missouri River. A total of 14 public port authorities and more than 200 private ports can be found along Missouri's waterways. Three public port authorities and more than 50 private ports operate along the Missouri River; 11 public port authorities and more than 150 private ports operate on the Mississippi River.

Waterway Condition and Performance

The lock and dam system, under the jurisdiction of the U.S. Army Corps of Engineers, was designed to control the river levels to maintain a minimum nine-foot deep channel on the Upper Mississippi River for more reliable navigation. The majority of the locks and dams were constructed in the 1930s and are aging. The locks and dams are in need of major rehabilitation or replacement, which is an expensive undertaking. Replacement may be the most economical and feasible option as many of the locks are undersized at 600 feet long and cannot accommodate standard 15-barge tow configuration, which is 1,200 feet. This causes operators to have to run smaller configurations or break down the barges to

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transport them through the locks, adding time to a shipping method that is already slower than other methods.

The seven locks and dams in or near Missouri are part of the Upper Mississippi River, starting just north of St. Louis and continuing to the Iowa border, and are listed in **Table 4-2**. **Figure 4-7** shows the age and location, as well as the annual volume of trade versus delays for the Upper Mississippi River locks and dams. The Lower Mississippi River (south of St. Louis) and the Missouri river contain no locks or dams.

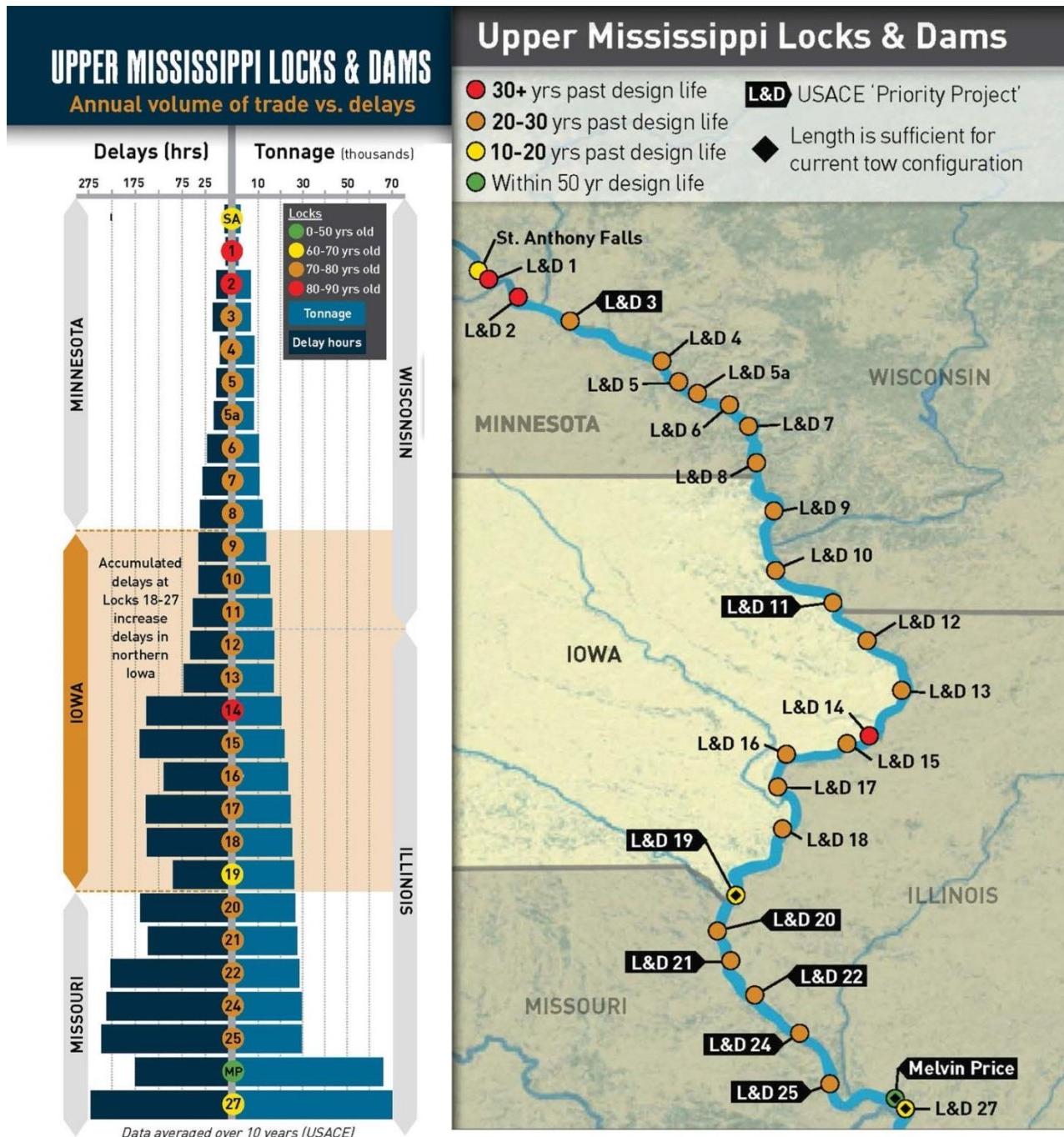
Table 4-2: Upper Mississippi Locks and Dams in or Near Missouri

Lock/Dam Number	Location
No. 20	Canton, MO
No. 21	Quincy, IL
No. 22	Saverton, MO
No. 24	Clarksville, MO
No. 25	Winfield, MO
No. 26 (Melvin Price)	East Alton, IL
No. 27 (Chain of Rocks Dam)	Glasgow Village, MO
No. 27 (Chain of Rocks Lock)	Granite City, IL

Source: U.S. Army Corps of Engineers

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Figure 4-7: Status of Upper Mississippi Locks and Dams



Source: "A River Run Dry," Iowa Department of Transportation, 2013

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The maintenance needs of the aging infrastructure are increasing at a rate much greater than the operations and maintenance funding provided for the waterway system. This adversely affects the reliability of the system. Long-established programs for preventive maintenance of major lock components have given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.



Waterway Capacity

A barge offers greater freight capacity than other freight transportation modes, as shown in **Figure 4-8**. A “standard” tow is 15 barges with a total capacity of 22,500 tons or 45 million pounds. “Large” tows on the Mississippi River below St. Louis can be as large as 40 barges. It would take 225 railroad cars or 870 semi-trucks to carry the same amount of cargo as a standard tow. The benefits of moving freight on the inland waterways include: a separation from highways and railways, efficient fuel consumption and low GHG emissions, and excellent safety record. Reducing fuel and labor costs reduces transportation costs, which in turn improves the profits for both commercial and agricultural industries. Waterways are the original Missouri transportation system. This resource led to wealth and development that then spread outward from Missouri’s rivers.

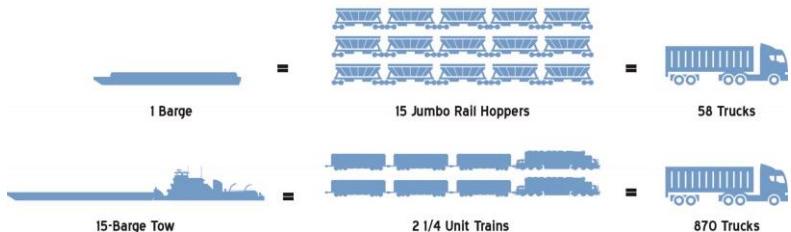
Waterways are comparable in capacity and importance to interstate highways. Annual cargo through Missouri’s ports is worth billions of dollars.

Waterways are currently uncongested and have capacity to move substantially more freight. Like other transportation networks, Missouri’s waterways, private ports, and public ports are important due to their significant economic impact.

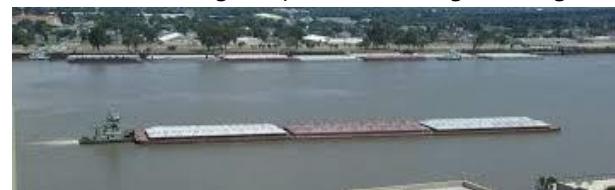
Lock and Dam #25 at Winfield, Missouri

Figure 4-8: Model Capacity Comparison

Equivalent Units



Source: www.celticmarine.com



Missouri River Barge

Chapter 4 – Freight Network Condition and Performance

Maintaining Navigation

Three public port authorities identified improving navigation on the Missouri River as an important performance issue. The Missouri River has potential to serve Missouri's agriculture industry; however, many competing demands for use of the Missouri River have made it difficult to maintain this waterway as a reliable means of freight transportation. Further, public and private port authorities have expressed concern about floodplain development restrictions that impede construction of cargo handling infrastructure.

Dredging has become a constant issue both in-channel on the Missouri and Lower Mississippi Rivers and at harbors on the Lower Mississippi River. In order to maintain navigation in these areas, dredging is often needed due to the regular flow of water and sometimes due to flood events. If a navigable channel cannot be maintained, freight moved on the water is slowed or stopped completely. This affects the performance of the waterways as a reliable method of shipping goods.

Waterway Freight

With the given waterway conditions and performance, Missouri's waterways carried 49.9 million tons of freight valued at \$12.5 billion in 2011. The top five port commodities by tonnage, units, value, and growth are provided in Appendix A.

Air

Missouri is home to three of the top 110 cargo airports in North America in terms of total tonnage in 2012: Kansas City International Airport (MCI), Lambert-St. Louis International Airport (STL), and Springfield-Branson National Airport (SGF).

Air Condition and Performance

Missouri's busiest cargo airports are located near major metropolitan areas that produce consistent passenger and air cargo traffic. Consequently, these facilities must be able to support large aircraft capable of accommodating market demand. The State's smaller airports, generally located near Missouri's medium-sized metropolitan areas, have infrastructure capable of supporting smaller-scale air cargo operations. These smaller airports can be, and often are, used to move cargo to larger Missouri airports or airports outside of the State.

Three Missouri cargo airports handled nearly 177,000 tons of total air cargo and mail in 2013, which reflects a 3.7 percent decrease annually since 2001. In this same time frame, Missouri's fastest growing airport by total tonnage was SGF, which increased by 0.95 percent annually. MCI and STL both experienced losses in total air cargo from 2001-2013.

Two issues could affect cargo at Missouri airports. First, stakeholder input identified freight concerns regarding onsite facilities at STL. There is an interest in improving old, outdated facilities and relocating

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them to a new site at STL. Second, the potential reduction in tower operations at Springfield Airport would limit the available operating hours at the airport.

Air Freight

With the given air freight conditions and performance, Missouri's airports transported 73,000 tons of freight valued at \$11.4 million in 2011. The top five port commodities by tonnage, units, value, and growth are provided in Appendix A.

Pipeline

Approximately 10,700 miles of pipelines move natural gas, crude oil, and petroleum products throughout Missouri. The highest percentages of pipeline miles, according to the USDOT Pipeline and Hazardous Materials Safety Administration (PHMSA) Missouri Incident and Mileage Overview, are in St. Charles County (4.9 percent), Cass County (3.6 percent), Audrain County (3.5 percent), and Johnson County (3.4 percent), which are located in the northern half of the State where the majority of major pipelines pass.

Pipeline Condition and Performance

There are several major crude oil, petroleum product, and liquefied petroleum gas pipelines crossing the State. Many of the crude oil and petroleum product pipelines originate near the Gulf Coast (Texas), Oklahoma, or Canada, and pass through the State in route to Midwest refineries.

TransCanada's proposed Keystone XL pipeline would connect to the existing Keystone Pipeline in Steele City, Nebraska, and increase access to Midwest markets. The project is currently awaiting decision on a Presidential Permit application. Enbridge is currently constructing the Flanagan South Pipeline Project adjacent to their Spearhead Pipeline to provide more efficient transportation of oil from western Canada and North Dakota to refinery hubs in the Midwest and Gulf Coast. The Flanagan South Pipeline is planned to be in service in 2014.

Pipeline Freight

With the given pipeline conditions and performance, Missouri's pipelines totaled 8.3 million tons valued at \$5.8 million in 2011. The top five port commodities by tonnage, units, value, and growth are provided in Appendix A.

Intermodal

There are three key elements of the intermodal system: the facilities where commodities are transferred from one mode to another, designated intermodal connectors that connect the major intermodal facilities to the freight network, and the first/last mile connectors that connect all remaining freight origins or destinations.

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Facilities

Chapter 3 describes the details of the intermodal facilities in Missouri. **Figure 3-8** displays the location of these intermodal facilities.

Intermodal Connectors

The Missouri Freight Network includes the 15 NHS freight-related intermodal connectors that provide the integral connections between major intermodal facilities and the NHS roadways. The Federal Highway Administration designated NHS freight intermodal connectors provides landside access locations to and from intermodal facilities for rail, waterway ports, and airports.

First and Last Mile Connectors

The first and last mile connectors were determined by evaluating the locations of the top 100 freight generators and intermodal facilities in Missouri relative to their proximity to the rest of the Missouri Freight Network. The first and last mile connectors are part of the Missouri Freight Network; connectors link the freight generators and intermodal facilities with the Missouri Freight Network.

Chapter 5 - Needs Assessment and Freight Forecast

KEY POINTS

- Missouri's central location in the United States was consistently identified as a top strength of the State's freight system and an asset for attracting new businesses.
- The sheer size of Missouri's highway system is a strength and challenge. While the highway system is well-connected for handling traffic, maintaining and upgrading that system is difficult.
- Freight tonnage is forecast to grow 37 percent from 2011 to 2030 with truck and rail continuing to dominate freight transportation in Missouri.

Introduction

Missouri has an integrated multimodal freight system that facilitates the efficient, reliable, and safe movement of freight. The challenge will be to maintain and expand the system to meet future needs.

To help Missouri plan and respond more effectively and create a transportation system prepared for the future, it is important to thoroughly assess needs for freight movement and forecast future demands related to freight by:

- Identifying the strengths and challenges of the existing system.
- Discussing freight system goals and objectives.
- Forecasting future freight transportation demands for highways, rail lines, ports, airports, and pipelines over the next 20 years.
- Considering emerging trends—issues outside traditional forecasting methods, but which could impact the future of freight in the State.

Freight movement is vital to Missouri's economy. A detailed assessment of future freight transportation needs will help Missouri prepare to keep freight moving smoothly.

Chapter 5 – Needs Assessment and Freight Forecast

Strengths and Challenges

A review of the State's competitive advantages and critical challenges helps identify the strengths and problems in the Missouri freight system. These strengths and challenges can be grouped into four categories: system capacity, system operations, safety, and connectivity.

System Capacity

The size of Missouri's transportation system is a strength. There is a well-connected system for handling highway freight traffic. Missouri has significant freight rail infrastructure with six Class I freight railroads and five short line railroads. These railroads provide important freight connections with the other freight transportation modes. Designated marine highways transport freight along the Missouri and Mississippi Rivers. Missouri also has 3 of the top 110 cargo airports in North America.

The size of the system also presents challenges. Maintaining and upgrading numerous miles of highways can be an issue, especially as funding continues to diminish. Roadway congestion, bottlenecks, and infrastructure that is nearing the end of its useful life are challenges. The annual hours and cost of truck delays are significant. For example, delay on I-44 is approximately 422,000 hours each year, costing the economy \$38.6 million annually¹. Capacity upgrades are already needed for I-70 between Kansas City and St. Louis, but I-44 was also identified as a key corridor for continued investment based on future volume projections. St. Louis and Kansas City contain 81 of Missouri's most congested truck bottlenecks; seven are located in Springfield. Missouri's rail lines are reaching maximum capacity at several locations. Missouri's waterways have adequate capacity but are often seen as unreliable due to inconsistent water levels and the lack of improvements to the lock and dam system. Air cargo facilities are limited and outdated; they need to be updated to accommodate changes in technology, security, and handling of larger cargo.

System Operations

Missouri currently ranks fifth best in the nation for transportation infrastructure². Due to the two statewide road improvement programs in the last decade, more than 89 percent of Missouri's major highways are rated in good condition. Similarly, other bridge-related programs dramatically decreased the number of bridge structures in poor condition. Less than one percent of the bridges in the State have low vertical clearance and only three percent of the load restricted bridges cross Missouri interstates.

Missouri has made great progress in addressing the condition of the transportation system, but there are still needs for maintenance and capacity improvements. Minimizing travel times and delays on the State's most traveled routes are essential to operating a reliable transportation system. Individual roadways within St. Louis and Kansas City experienced longer travel times than the regional averages. Columbia and Springfield also experience delays. Due to Missouri's central geographic location, when

¹ Missouri Department of Transportation, Tracker Report, April 2014

² Missouri Department of Transportation, Tracker Report, April 2014

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interstates are shut down, it can be difficult to move freight east/west across the country. In 2013, I-70 experienced 26 complete closures and I-44 experienced 22³. While the number of bridges in poor condition decreased, the number of bridge structures in good condition also dropped over a five-year period.

The service discontinuance and abandonment of short-line rail track creates an almost irreversible situation for rail freight to reach adjacent businesses. Further, this may interrupt some last-mile and intermodal connections. Private ownership and operation of rail lines makes track monitoring and upgrades difficult.

Much of the lock and dam system on the inland waterway system is in need of major rehabilitation or replacement. The lack of dredging to maintain navigable channels and harbors on both the Missouri and Mississippi Rivers hinders efficient and reliable waterborne freight movements.

Safety

Improvements in safety have been a strength of the highway system over the last decade. Roadway safety improvements helped reduce overall roadway fatalities from 1,200 in 2005 to less than 800 in 2013, the lowest level since the 1940s. There were 82 Commercial Motor Vehicle (CMV) crashes through the fourth quarter of 2013, which is 22 fewer than reported in 2012. Between 2009 and 2013, fatal crashes involving CMV decreased by 8.9 percent, and the number of CMV serious injury crashes decreased by 21.3 percent.

Diminished funding will hamper MoDOT's ability to make significant safety improvements in the future. Key issues include: the lack of an information system that conveys available truck parking locations to commercial drivers, need for safety and security at truck parking locations, numerous at-grade rail crossings and roadway design improvements to facilitate safety. In particular, at-grade rail crossings continue to present a safety issue and improvements are needed. In 2011 and 2012, Missouri had 50 highway-rail incidents each year, while in 2013 there were 53 highway-rail incidents.

Connectivity

Missouri's central location in the United States is consistently identified as a top strength of the State's freight system and an asset for attracting new business. The Kansas City area is one of the largest rail freight and trucking hubs in the country, while St. Louis is the third largest for rail. St. Louis is working diligently to develop into a freight hub as well. The Springfield/Joplin area is near major truck freight operations in Northwest Arkansas. The Missouri River and Lower Mississippi River are key assets due to their central location and because they are lock-free. The expansion of the Panama Canal may have some impact on freight movements in Missouri. This change could manifest itself in various ways to include some directional freight flow changes, shifting among transportation modes, and overall freight volume changes.

³ Missouri Department of Transportation, Tracker Report, April 2014

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One of the biggest problems with connectivity is that some transportation modes are not readily accessible or in close proximity to other modes (e.g., rail to water ports). Major freight generator sites have been identified throughout the State. Improving freight modal connections, including short line rail connections, to freight generator sites is important for providing options for businesses to improve their supply chains and their competitiveness in the marketplace. Stakeholders at regional workshops indicated that future growth is threatened by railroads closing local crossings and spurs and removing scales.

Freight System Goals and Objectives

After examining the strategic frameworks from relevant State plans, other statewide and regional plans, and the new federal requirements as defined by *Fixing America's Surface Transportation (FAST) Act*, MoDOT determined that the goal areas developed for Missouri's Long Range Transportation Plan should also be adopted as the freight plan goals. The goals focus on maintenance, safety, economy, and connectivity/mobility. The Freight Plan looks at these goals in more detail as they directly relate to freight movement. Three strategic considerations have also been incorporated in this Freight Plan: environmental, organizational/process, and customers/partners. **Figure 1-4** in Chapter 1 shows the relationship between the Freight Plan goals and the FAST Act goals.

Stakeholder input and a review of other freight-related plans helped craft a group of objectives, which are listed below according to goal.

Goal 1: Maintenance

The maintenance goal aims to ensure that the freight system and services are maintained in good condition by:

- Keeping the highways and bridges in good condition
- Supporting and encouraging the maintenance of railways, waterways, airports, and multimodal connections

The good condition level will be increasingly difficult to maintain for all freight modes because of a lack of consistent, reliable, and dedicated funding.

Goal 2: Safety

The safety goal looks to improve safety on the highway and rail freight system by:

- Decreasing the number and severity of crashes involving CMVs
- Improving safety at railroad crossings

While the instances of CMV highway crashes has trended downward, highway-rail crossing incidents have slightly increased over the last several years. MoDOT continually strives to decrease the number and severity of incidents across all transportation modes. However, diminished funding will hamper MoDOT's ability to make significant safety improvements in the future. There currently is not a need

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for additional freight-related safety goals that address the other transportation modes (i.e., air, water, and pipeline).

Goal 3: Economy

The economy goal supports economic growth and competitiveness as well as job growth in Missouri by:

- Improving the economic competitiveness in Missouri through improvements to the freight system
- Enhancing and supporting opportunities for economic development and job growth through improvements to the freight system

While the cost to ship several of Missouri's major export commodities (e.g., soybeans, automobiles, and chemicals) is relatively low compared to competing states, MoDOT has recently begun quantifying and calculating costs as a reflection of goods movement and competitiveness. The bulleted items above have been identified as performance measures in the Missouri State Freight Plan and will continue to be monitored in relation to meeting economic goals.

Goal 4: Connectivity and Mobility

The connectivity and mobility goal seeks to improve the connectivity and mobility of the freight system throughout the State by:

- Improving the multimodal connectivity of the freight system
- Reducing congestion and increasing reliability on roadways
- Supporting and encouraging improved efficiency of rails, waterways, and airports
- Improving connections to freight generators

MoDOT recently began measuring annual hours of truck delay and calculating the truck reliability index in their quarterly performance tracker report. These parameters have been identified as performance measures in the Freight Plan and will continue to be monitored in relation to meeting the connectivity and mobility goal.

20-Year Freight Forecast

A vast amount of freight traverses Missouri's infrastructure annually. This freight includes finished goods, materials, and supplies. In the future, highway and rail systems will continue to be relied on as Missouri's primary freight transportation modes. Missouri continues to accommodate a large percentage of through freight movements, defined as movements that neither originate nor have destinations in Missouri. This places strain on the Missouri system because through freight movements cause wear-and-tear on the transportation system but do not provide the economic benefits that normally accompany freight movements that originate or end within Missouri.

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Freight tonnage across the Missouri freight network is forecast to grow by 378.8 million tons, a 37.3 percent increase from 2011 to 2030 (1.7 percent increase annually)⁴. Truck and rail are the dominate modes of freight transportation in Missouri. Truck movements account for 49 percent of the total freight tonnage, and rail movements account for 45 percent. Trucking is forecast to grow by 55.5 percent (2.4 percent annually), from 500.4 million tons in 2011 to 778.1 million in 2030, a 277.7 million ton increase. The 277.7 million ton increase in truck freight movement accounts for 73.3 percent of the total growth and about half of truck movements are attributable to through movements. While rail growth is forecast to grow by 19 percent (0.9 percent annually), from 458.1 million tons in 2011 to 545.2 million tons in 2030, it still constitutes 40 percent of the total tonnage moved through Missouri. Additional details are available in the Appendix A.

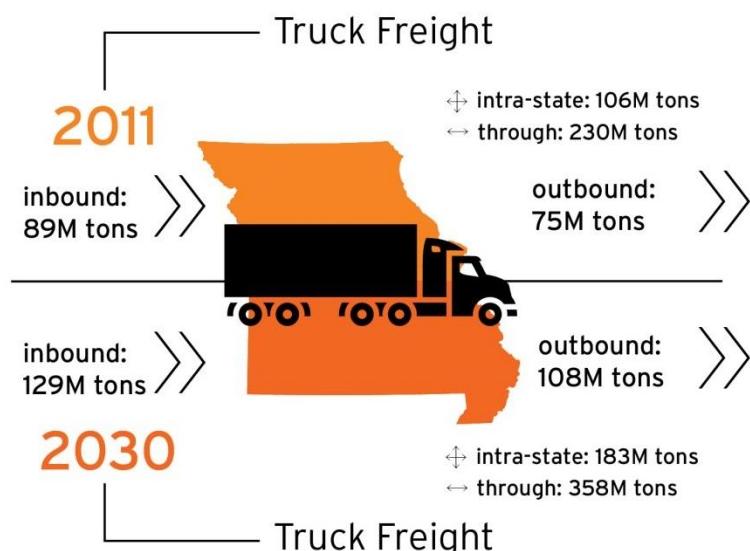
⁴ TRANSEARCH Data, 2011

Chapter 5 – Needs Assessment and Freight Forecast

Truck Forecast

Figure 5-1 depicts the directions of truck freight movements in Missouri between 2011 and 2030. Truck tonnage is forecast to increase 55.6 percent between 2011 and 2014. Truck commodity value is forecast to increase from \$710.9 billion in 2011 to \$1.20 trillion by 2030, a cumulative increase of 68.4 percent (2.8 percent annually).

Figure 5-1: Missouri Truck Tonnage Forecast by Direction, 2011 and 2030



Total Truck Freight Growth by 2030:

+ 55.6%

inbound » + 44.6% outbound » + 44.0%

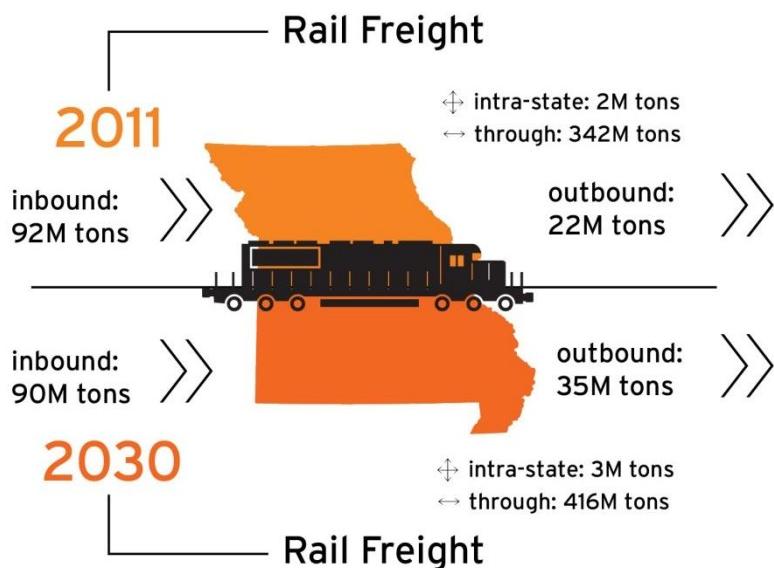
intra-state » + 72.9% through » + 55.5%

Chapter 5 – Needs Assessment and Freight Forecast

Rail Forecast

Figure 5-2 depicts the directions of rail freight movements in Missouri between 2011 and 2030. Rail tonnage is forecast to increase from 458.1 million in 2011 to 545.2 million in 2030, a cumulative increase of 19.0 percent (0.9 percent annually). Rail commodity value is forecast to increase from \$465.0 billion in 2011 to \$790.6 billion by 2030, a cumulative increase of 70.0 percent (2.8 percent annually). Note that inbound tonnage is forecast to decline, primarily due to less coal consumption for power plants as use of natural gas increases, renewable energy sources increase, and other power technologies improve.

Figure 5-2: Missouri Rail Tonnage Forecast by Direction, 2011 and 2030



Total Rail Freight Growth by 2030:

+ 19.0%

inbound » - 2.3% outbound » + 64.4%

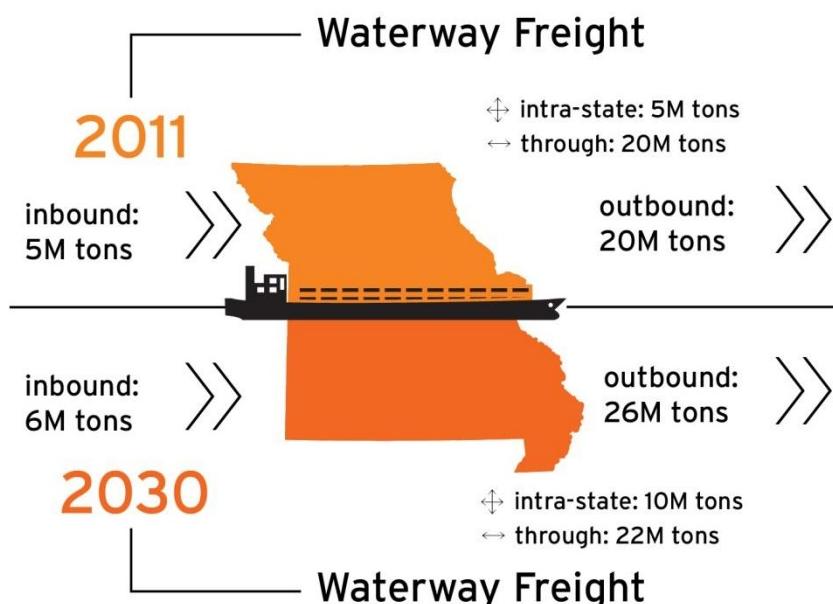
intra-state » + 32.9% through » + 21.8%

Chapter 5 – Needs Assessment and Freight Forecast

Port Forecast

Figure 5-3 depicts the direction of port freight movements in Missouri between 2011 and 2030. Port tonnage is forecast to increase from 49.9 million in 2011 to 63.3 million in 2030, a cumulative increase of 26.9 percent (1.3 percent annually). Port commodity value is forecast to increase from \$12.5 billion in 2011 to \$15.4 billion by 2030, a cumulative increase of 23.1 percent (1.1 percent annually).

Figure 5-3: Missouri Waterway Tonnage Forecast by Direction, 2011 and 2030



Total Waterway Freight Growth by 2030:

+ 26.9%

inbound » + 16.0%

outbound » + 29.8%

intra-state » + 93.6%

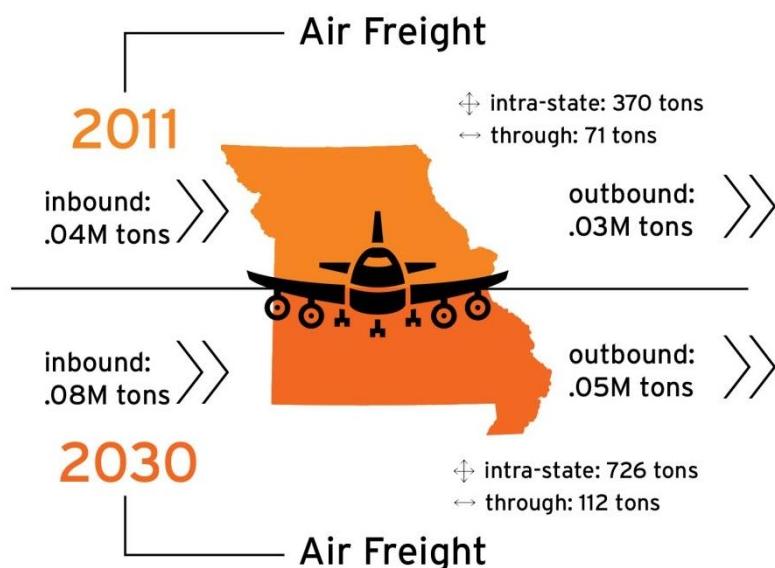
through » + 10.2%

Chapter 5 – Needs Assessment and Freight Forecast

Air Forecast

Figure 5-4 depicts the direction air freight movements in Missouri between 2011 and 2030. In this time period, outbound freight movements decrease in relative proportion, while inbound movements increase. Air tonnage is forecast to nearly double from 73,003 in 2011 to 139,296 in 2030, a cumulative increase of 90.8 percent (3.5 percent annually). Air commodity value is forecast to increase from \$11.4 billion in 2011 to \$27.5 billion by 2030, a cumulative increase of 141.8 percent (4.8 percent annually).

Figure 5-4: Missouri Air Tonnage Forecast by Direction, 2011 and 2030



Total Air Freight Growth by 2030:

+ 90.8%

inbound » + 119.8% outbound » + 58.5%

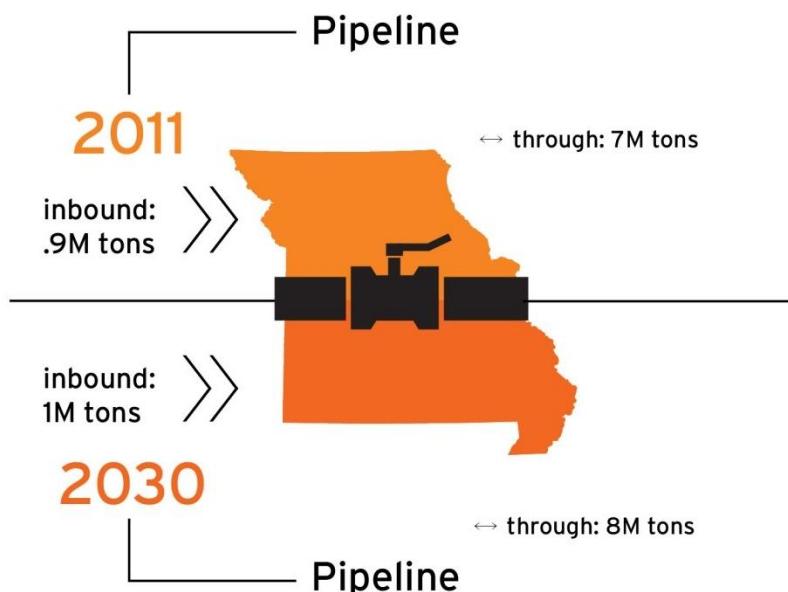
intra-state » + 96.2% through » + 56.8%

Chapter 5 – Needs Assessment and Freight Forecast

Pipeline Forecast

Figure 5-5 depicts the direction of pipeline freight movements in Missouri between 2011 and 2030. Pipeline freight movements are only inbound, and that is expected to remain unchanged over the future analysis horizon. Pipeline tonnage is forecast to increase from 8.3 million tons in 2011 to 9.0 million in 2030, a cumulative increase of 6.5 percent (0.3 percent annually). Pipeline commodity value is forecast to increase from \$5.8 billion in 2011 to \$6.1 billion by 2030, a cumulative increase of 6.5 percent (0.3 percent annually).

Figure 5-5: Missouri Pipeline Tonnage Forecast by Direction, 2011 and 2030



Total Pipeline Freight Growth by 2030:

+ 6.5%

inbound » + 6.6% through » + 6.5%

Chapter 5 – Needs Assessment and Freight Forecast

Growth in freight movements across all modes of freight transportation requires continued improvements and maintenance to the freight system to accommodate this growth. Chapter 9 discusses the specific projects and programs identified for maintaining and improving the freight system.

Emerging Trends

This section discusses the emerging freight trends in the State. Identifying these trends helps to anticipate needs and develop programs and policies to address them.

Trade and Industry Growth

There is a close relationship between industrial health and vitality and transportation. Industries need parts and supplies to manufacture products (i.e., agricultural grains, food products, and automobiles) that are then transported across Missouri, the country, and the world. Transportation is responsible for bringing supplies into Missouri as well as exporting the products of Missouri industries.

Manufacturing productivity in the U.S. increased 73 percent between 1993 and 2011, according to the U.S. Department of Commerce. Today, U.S. manufacturing accounts for 20 percent of the world's manufacturing output, and U.S. manufacturing is greater than that of China, India, Brazil and Russia combined.

Many of Missouri's exports have increased in the last decade. Exports of aircraft have doubled since 2009 and the global demand for aircraft is expected to double over the next twenty years, which translates to significant business opportunities for the Missouri aerospace and aviation sector.

Chemicals are Missouri's second largest international export and the chemical industry employs over 17,000 workers. Missouri food and food ingredient exports have increased 148 percent since 2005. There has been an increased demand for U.S. agricultural products due to higher quality standards and greater variety. Export industries in Missouri account for 95,000 direct jobs.

The expansion of the Panama Canal, which is expected to be completed in 2015, will likely have some impact on future freight flows. The timing and scale of the impacts on Missouri freight flows are unknown but it is anticipated that there will be some change in the demands on transportation networks, service, and operations.

All of these factors lead to a growth in freight movements in Missouri. In turn, the growth in freight movements will result in increased demands on the highways, rail lines, port facilities, and airports that handle freight.

Chapter 5 – Needs Assessment and Freight Forecast

Institutional and Regulatory Trends

Federal, institutional, and regulatory trends may affect Missouri freight transportation. Examples of these trends and their potential effects are:

- Federal regulation of trucking/trucker safety could affect costs and cause driver shortages
- Public-private partnership financial market trends for private capital in transportation infrastructure projects
- Federal water resource policy trends could impact waterborne freight
- U.S. Department of Agriculture food product traceability requirements could make bulk food shipping less attractive
- U.S. Department of Homeland Security requirements for electronic pre-filing of export documentation could take additional time and cause delays
- U.S. Environmental Protection Agency emission requirements for marine diesel barge engines and rail locomotive engines could require retrofitting existing equipment
- At the local and state level, the acceptance of “Complete Streets” policies could impact the movement of freight, particularly in the last mile of delivery

Population Trends

As Missouri’s population and employment grows, the demand for and production of finished goods will increase throughout the State, and the transportation of these goods will increase accordingly.

According to economic data, Missouri is expected to have an annual population growth rate of 0.62 percent from 2012 to 2040. This results in more than a million additional Missouri residents by 2040. Additional information can be found in Appendix B.

Logistical Challenges

A number of logistical challenges face shippers in Missouri and throughout the Midwest:

- Variable shipping rates as they relate to the variability of fuel costs and truck driver availability
- Growing shortage of labor for trucking, rail, and water
- Availability of truck and rail equipment

In particular, recruiting trained labor is becoming increasingly difficult due to experience and training requirements and an aging workforce. Labor shortages will impact what happens in the industry as shippers continue to try to keep costs down and become more efficient.

Technology Trends

Technology trends could impact freight movement in Missouri:

- Dedicated truck lanes could improve safety and allow for the potential use of advanced technology to move more freight. However, there is not a consensus on how to develop, fund, or finance a dedicated truck lane project.

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- A Freight Shuttle System would use autonomous transporters to move trailers or containers in a highway median, but the technology likely will not be available for some time.
- E-commerce requires fast, on-time deliveries, but is affected by distance and travel direction. E-commerce also brings more parcel delivery vehicles into neighborhoods, causing congestion and wear-and-tear on the local road network.
- Natural gas is the fastest-growing fuel in the transportation sector due to its comparatively lower price, but there is a high initial cost to retrofit or replace existing equipment. The high demand for natural gas from the trucking industry has prompted the fuel retail industry to provide compressed natural gas (CNG) and liquefied natural gas (LNG) at fuel stations on major truck corridors.
- The use of container-on-vessel (COV) for moving containers on the inland waterway can, in certain situations, be an alternative to truck and rail transport. However, there are problems with port readiness, delivery requirements to sustain service, and inefficiencies in backhauling and positioning empty containers.

Some of these concepts, such as dedicated truck lanes, have been studied in Missouri. Other concepts would need additional planning to determine their viability, cost-benefit ratio, and overall applicability to the freight network in Missouri.

Identified Needs

Freight network needs were identified through an analysis of the strengths and challenges of the Missouri freight system, 20-year freight forecast, and emerging trends. The identified needs are discussed below according to freight transportation mode. Each identified need falls into one of six categories: system capacity, system operations, freight network, safety, connectivity, and policy regulations.

Highway

The identified highway transportation needs are:

- Improved corridor capacity
- First and last mile connectors
- Improved freight movement through bottlenecks (see **Figure 4-3** in Chapter 4 for the locations of the 100 most congested bottlenecks in Missouri)
- Safety improvements such as sufficient numbers of safe truck parking spots at rest areas and weigh stations, reduction in the number of at-grade rail crossings, and improved roadway design and geometrics
- Connectivity to major freight generator sites, including last mile connections

While Missouri did not have a designated freight network, this Missouri State Freight Plan identifies the designated Missouri Freight Network to help prioritize improvements for all modes of freight transportation, including highways (see Chapter 3).

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Rail

The identified rail transportation needs are:

- There are congestion and capacity issues on numerous rail lines throughout the State. Improvements to the rail lines with congestion and capacity issues are needed.
- The Kansas City area currently has a bottleneck at intersecting rail lines. St. Louis also faces issues because rail lines historically connected at Union Station for passenger rail, resulting in a network of multiple connections which can require days to switch rail cars across the region.⁵ Coordination with the rail companies that own these rail lines and a solution to eliminate these bottlenecks is needed.
- At-grade rail crossings throughout the State present a safety issue. Improvements at all at-grade rail crossings with safety issues are needed.
- In the Northwest and Northeast MoDOT districts, short line rail lines are being removed, adversely affecting economic development in these areas. Coordination with the short line rail companies is needed to craft a different solution than removal of rail lines.
- At the Howard/Cooper Regional Port, rail access to and from this port is needed.
- St. Louis has two rail bridges across the Mississippi River that support all Class I railroad crossings, the Merchants Bridge and the MacArthur Bridge. Both bridges are more than 100 years old and require major work to strengthen and reinforce capacity.

Air

The identified air transportation needs are:

- The cargo facilities at the St. Louis Airport (STL) are limited and outdated. These facilities need to be updated and expanded.
- The Springfield Airport (SGF) has been identified as an airport that may have its tower hours reduced by the FAA. Reduction of the tower hours could reduce the airport's capacity to handle freight at key nighttime hours.
- The safety and perimeter security at the Kansas City International Airport (MCI) is in need of additional, updated, and improved fencing and gates.

Water

The identified waterborne transportation needs are:

- At ports throughout the State, increased maintenance activities are needed on both the land and water sides of the operations.
- Upgrades and rehabilitation is needed on many of the locks and dams in the State. Coordination with the U.S. Army Corps of Engineers will be needed.

⁵ St. Louis Regional Freight Study, June 2013

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- Sufficient depth for navigation is needed in channels and at harbors. This is achieved through additional dredging or through increased water releases from upstream dams.
- Numerous emerging ports have been identified throughout the State. Support for their development is needed.

Pipeline

There are no freight system needs identified for the pipeline mode of transportation.

Intermodal

The identified intermodal needs are:

- New intermodal connection points are needed.
- Improved intermodal road connections to ports are needed at several locations in the State.
- First and last mile intermodal connections are needed.

Funding

The majority of Missouri transportation funds come from fuel taxes. State fuel tax rates have not increased since 1993, and Missouri has one of the lowest state fuel tax rates in the nation. This has put pressure on the transportation sector to find alternative funding sources for highway projects. Funding is also an issue in upgrading and expanding ports, locks and dams, airports, and intermodal facilities in order to stay competitive. There is need to identify innovative and alternative funding sources. These issues have created project funding challenges for MoDOT.

Conclusions

The purpose of identifying needs as seen through the lens of the identified strengths and challenges of Missouri's transportation system, the future forecast of freight in the state and other emerging trends is to better inform the decision-making process. The needs discussed in this chapter have been considered as the strategies and recommendations of the Freight Plan contained in subsequent chapters and will help to make implementation of the outcomes more successful.

Chapter 6 - Economic Context of Freight

KEY POINTS

- The amount and value of freight are critical components of the overall economic health of Missouri. Missouri's multimodal freight system supports the movement of trucks, planes, barges, and trains as they transport over one billion tons of freight valued at more than \$1.2 trillion per year.
- Every resident in the State spends a significant portion of their disposable income (\$4,500 per year) on transportation, whether directly or indirectly, in the goods they purchase.
- Truck freight will continue to grow in importance based on both value and tonnage. While at a slower rate, the freight moved by air, water, and rail will also continue to grow.

Introduction

Approximately half of Missouri's economy is highly dependent on freight and everyone is affected by freight on a daily basis. Freight is integral to job growth and economic development. Most of the time, Missouri's freight system accommodates the movement of a significant amount of valuable freight with ease. However, congestion, safety concerns, issues with first and last mile connectors, and challenges with overall system operations can sometimes substantially cost haulers and shippers who rely on the freight system. As the importance of trade and the demands of customers continue to evolve, Missouri companies often find freight an increasingly important factor in sustaining and enhancing their competitive position in the marketplace through reliable connections to customers and links to a multitude of markets to ensure timely deliveries of goods and services.

Importance of Freight to Missouri's Economy

Missouri's freight system and the State's economy are closely connected. Freight movement and the Missouri freight system support the State's economy by:

- Allowing Missouri manufacturers to bring in raw materials and parts, and transport products to and from other parts of the State, across the country, and around the world.
- Allowing Missouri farmers and agricultural producers to get their products to market and bring feed, seed, and equipment to their farms.

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- Ensuring that the goods Missouri residents need are available in local stores or can be delivered to their homes.
- Directly employing approximately 83,500 Missourians in transportation and warehousing industries¹ and those in numerous other industries indirectly.

Statewide Importance and Trade

Missouri's strategic position in the heartland of the country and access to diverse freight transportation modes mean that a lot of goods are shipped into, out of, within, and through the State. This also means that manufacturers and shippers choose Missouri to facilitate the shipment of freight to consumers and markets. Chapters 2 and 4 of this plan discuss this freight movement by transportation mode in detail.

Table 6-1 has removed the through freight traffic and summarizes only the economically relevant data for Missouri freight movements in 2011.

Table 6-1: Summary of Missouri Freight Movement by Tonnage and Value per Mode

Direction	Air	Pipe	Rail	Truck	Water	Total
Tons						
Outbound	34,313	#N/A	21,510,433	75,301,621	19,973,291	116,819,658
Inbound	38,249	932,258	92,326,793	89,250,507	5,093,847	187,641,654
Intrastate	370	#N/A	2,436,087	105,627,915	4,941,503	113,005,875
Through	71	7,412,827	341,805,597	230,212,488	19,850,043	599,281,026
Total	73,003	8,345,085	458,078,910	500,392,531	49,858,684	1,016,748,213
Value, in millions						
Outbound	\$7,620	#N/A	\$40,364	\$95,005	\$3,479	\$146,468
Inbound	\$3,656	\$643	\$39,647	\$119,731	\$3,083	\$166,760
Intrastate	\$100	#N/A	\$1,616	\$62,346	\$117	\$64,179
Through	\$10	\$5,117	\$383,409	\$433,794	\$5,870	\$828,200
Total	\$11,387	\$5,761	\$465,035	\$710,876	\$12,549	\$1,205,607

Source: Prepared by CDM Smith, based on TRANSEARCH® data for 2011

Missouri has several key domestic trading partners, listed in **Table 6-2**. Between 2011 and 2030, outbound freight shipped from Missouri to other states and internationally is expected to grow by 45.3 percent.

¹ 2013 Data Produced by the Missouri Economic Research and Information Center (MERIC) in cooperation with U.S. Department of Labor, Bureau of Labor Statistics.

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Table 6-2: Missouri's Major Domestic Trading Partners

<u>Outbound Freight 2011</u>	<u>Inbound Freight 2011</u>
Illinois	Wyoming
Texas	Illinois
Kansas	Kansas
California	Iowa
Arkansas	Arkansas
Iowa	Texas
Oklahoma	North Dakota
Arizona	California

Source: Prepared by CDM Smith based on TRANSEARCH® data for 2011

Not surprisingly, Missouri's major trading partners include neighboring states, energy supplying states (Wyoming coal and Texas and North Dakota petroleum), and large coastal population centers (Texas and California).

Missouri exported approximately \$13 billion in goods to other countries in 2013. The State's largest trading partners include North American Free Trade Agreement (NAFTA) countries of Canada and Mexico and also China². While domestic exports to other U.S. states are significantly higher than international exports, international freight is still important to the Missouri economy.

Supply Chains and Goods Movement Competitiveness

Efficient freight transportation in Missouri is essential for the supply chains of the State's industries. Supply chains are the pathways that raw materials and products move from their original source, through the production process, eventually reaching the end consumer. Supply chains have grown more sophisticated as businesses look to minimize supply chain costs and maximize profits.

² U.S. Census Bureau Foreign Trade Division and WISERTrade.

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For example, Missouri is a major producer of beef. Feed grain and feeder cattle are imported to the feed yards. Finished cattle are then shipped to a meat processing plant to be processed, and then the meat is shipped to grocery stores or another final destination as a finished product. Every product Missouri residents buy is created and delivered through these complex supply chains and each step uses the freight transportation network to deliver inputs and finished goods in a timely manner. If the freight network breaks down, so do these supply chains. The efficiency of these chains has a significant impact on how various companies compete.

Freight transportation is a key competitiveness factor for Missouri businesses. Some industries are highly dependent on transportation, as measured by the amount spent on transportation as a share of the total output. Based upon the most recent analysis by the U.S. Department of Transportation (USDOT) Research and Innovative Technology Administration, the average agriculture or forestry business spends 14 percent of each dollar of product output for transportation. The average manufacturing business spends 8.5 percent, and the average transportation equipment and parts business spends 12.5 percent.³

As part of this Freight Plan, the Missouri Department of Transportation (MoDOT) developed a performance measure to track the effectiveness of the transportation of goods in Missouri that are involved in trade to other states and countries. The measure tracks annual trends in the cost of transporting three key commodities (soybeans, crop production products, and motor vehicles) in Missouri compared to the costs of transporting these commodities in other Midwest states. There is much more to economic competitiveness than just the costs associated with transporting these commodities. However, this performance measure offers some insight into the costs for moving goods using different modes and to different destinations. More details can be found in Appendix F.

Figures 6-1, 6-2, and 6-3 show the current relative costs for transporting these three key commodities. As the figures illustrate, Missouri is highly competitive for some goods and less competitive for others.

³ "Transportation Satellite Accounts: A Look at Transportation's Role in the Economy, 2012

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Figure 6-1: Cost of Shipping One Ton of Soybeans from Key States to New Orleans (largely by barge), 2014



Figure 6-2: Cost of Shipping One Ton of Crop Protection from Key States to Mexico (largely by rail), 2014



Figure 6-3: Cost of Shipping One Motor Vehicle from Key States to Toronto (by truck) and Los Angeles (by rail), 2014



Chapter 6 – Economic Context of Freight

Economic Impacts of Freight in Missouri

What is the value and economic impact of freight on Missouri's economy? How much of Missouri's economy is affected by or relies on freight? In this Freight Plan, specific data sources and economic models are used to address these questions. The TRANSEARCH® freight database is used to analyze Missouri goods movements, commodity volumes, and values. The IMPLAN® economic model is used to determine how freight movements generate economic impacts in Missouri.

Economic impacts can be grouped into direct, indirect, and induced impacts:

- **Direct** – Impacts from transportation providers delivering transportation services as well impacts from transportation users shipping and receiving goods.
- **Indirect** – Impacts associated with the suppliers that provide intermediate goods and services to the directly impacted industries.
- **Induced** – Impacts associated with re-spending earned income from both the direct and indirect impacts in the study area.

Direct, indirect, and induced impacts combined are used to estimate the total economic impact of freight. Each impact is measured in terms of employment, income, value-added (i.e., GSP), output, and taxes. The industries that use transportation services, such as manufacturing and production industries are much larger than transportation service provider industries and thus generate the greater economic impacts.

Total Impacts as Percentage of State Economy

An understanding of the overall size of the State's economy provides context for the estimated impacts specifically from freight. The economic impacts of freight are best compared with the existing economic composition of Missouri in 2011. **Figure 6-4** shows 2011 freight-related economic data compared to the economic data for Missouri as a whole.

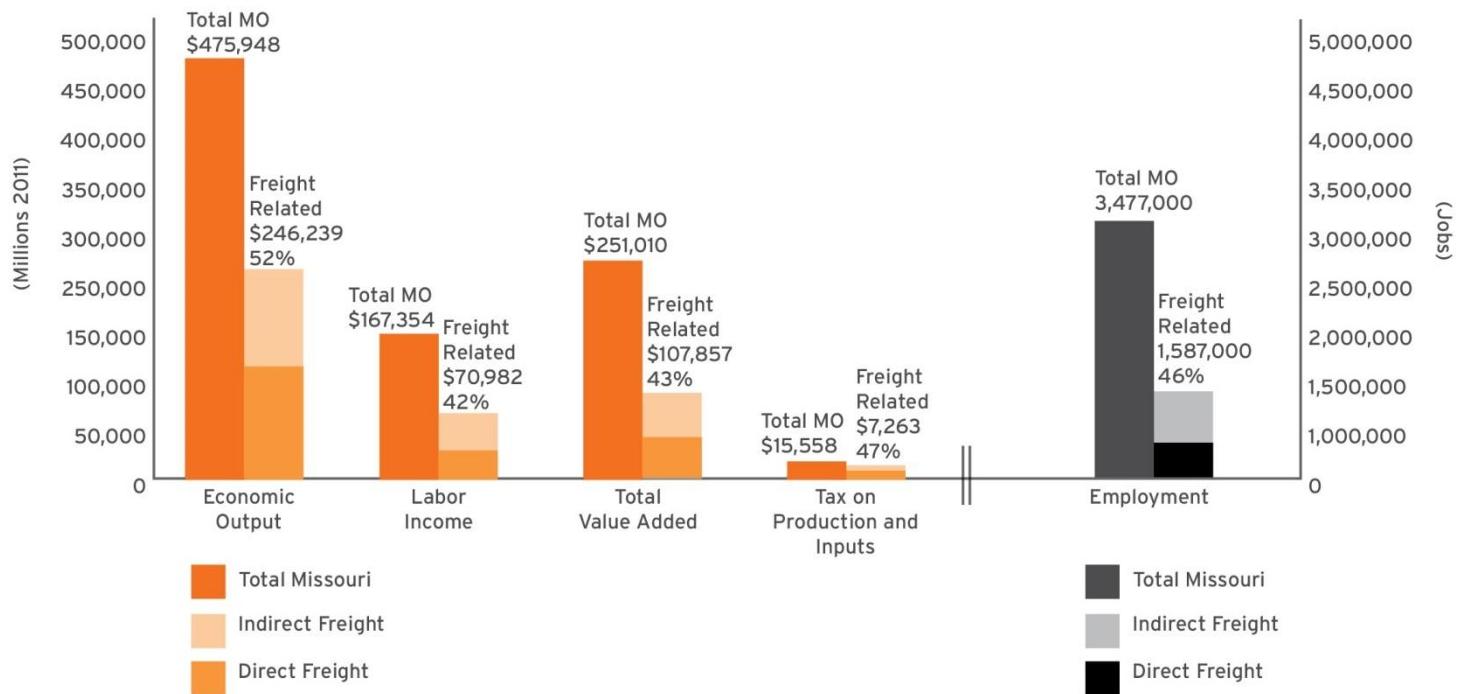
Gross State Product (GSP)

The monetary value of all the finished goods and services produced within a state's borders in a specific time period, though GSP is usually calculated on an annual basis.

It includes all private and public consumption, government spending, investments, and exports less imports.

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Figure 6-4: 2011 Missouri Economic Data Compared with Freight Economic Data (in Millions of Dollars)

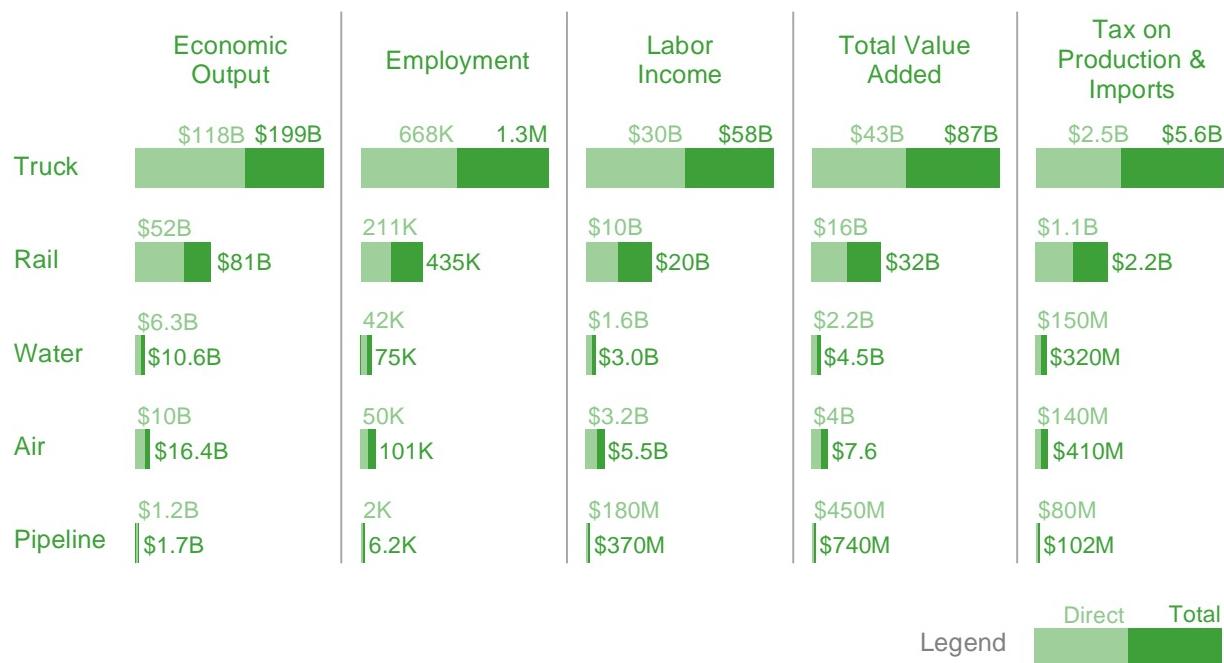


Source: TRANSEARCH Data modeled with IMPLAN®

Total economic impacts related to freight movements in Missouri range from 42 percent (labor income) to 52 percent (economic output) of the statewide economy, depending on the measure. Freight transportation service providers directly comprise between 0.7 percent and 2.2 percent of the Missouri economy; including the multiplier impacts. The total impact ranges between 2.6 percent and 3.8 percent. For users of freight, the total (direct and multiplier) impacts are between 38.6 percent and 47.9 percent of the State's economy. This is reflective of industries specifically reliant on freight; in reality every person or business that buys goods or receives a package uses the freight system. **Figure 6-5** presents the impacts categorized by mode.

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Figure 6-5: Estimated Economic Impacts of Freight in Missouri by Mode



Source: TRANSEARCH Data modeled with IMPLAN®

As Figure 6-5 shows, truck and rail freight have the greatest economic impact of freight in Missouri, which is expected since they lead the State in tonnage and value of freight carried. Note that the estimates for waterborne freight may be conservative because the data do not include non-NAFTA country (countries other than Canada and Mexico) freight movements by water. In other words, if freight moves out of a Missouri port by barge and is then loaded on a ship to Asia, it is not captured in the data. The reason it is not captured in the data is that the tracking data used for that freight is not reliable.

The totals in Figure 6-4 do not add to the totals in Figure 6-5 due to intermodal overlap. As shippers and receivers in Missouri use various transportation modes in combinations, such as truck and rail, to move the same product, a simple sum of the totals would overestimate the impact estimates. As a result, the analysis removes this potential double-counting of impacts when developing the statewide totals.

In conclusion, the data suggests that approximately half of Missouri's economy is substantially affected by freight, either directly or indirectly. Almost everyone relies on freight in some form on a daily basis.

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Freight, Jobs, and Economic Development

Missouri's economy is significantly affected by and dependent on freight movements. Effective movement of freight is directly linked to job growth and economic development.

Jobs

Freight-related jobs are directly tied to key Missouri industries. The North American Industry Classification System (NAICS) defines industry sectors. **Table 6-3** lists the most economically important NAICS-defined industry sectors for various freight transportation modes. As shown in the table, more than 50 percent of the total truck and rail freight-related employment is concentrated within the top industry sectors for the State—manufacturing; transportation and warehousing; retail trade; agriculture, forestry, fishing, and hunting; health and social services; and accommodation and food services. Almost 50 percent of the total employment impacts stemming from water-related freight movements are concentrated within the top four Missouri industry sectors—agriculture, forestry, fishing, and hunting; manufacturing; transportation and warehousing; and retail trade. Over 50 percent of the total employment impacts stemming from air-related freight movements are concentrated within the top three Missouri NAICS-defined industry sectors—manufacturing, retail trade, and health and social services.

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Table 6-3: Top Industries with Highest Employment Impacts Due to Freight

Mode	Industries
Truck	<ul style="list-style-type: none">• Manufacturing• Transportation and Warehousing• Retail Trade• Agriculture, Forestry, Fishing and Hunting• Health and Social Services• Accommodation and Food Services
Rail	<ul style="list-style-type: none">• Manufacturing• Transportation and Warehousing• Retail Trade• Agriculture, Forestry, Fishing and Hunting• Health and Social Services• Accommodation and Food Services
Water	<ul style="list-style-type: none">• Agriculture, Forestry, Fishing and Hunting• Manufacturing• Transportation and Warehousing• Retail Trade
Air	<ul style="list-style-type: none">• Manufacturing• Retail Trade• Health and Social Services

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For three key transportation-reliant sectors—agriculture, manufacturing, and transportation and logistics—10-year trends for Missouri jobs and economic performance (as measured by gross domestic product, or GDP) are presented in **Figures 6-6, 6-7, and 6-8**.

Figure 6-6: Jobs and Economic Growth (GDP) in the Agriculture Industry in Missouri



Figure 6-7: Jobs and Economic Growth in the Manufacturing Industry in Missouri



Figure 6-8: Jobs and Economic Growth in the Transportation/Logistics Industry in Missouri



Source: Missouri Department of Economic Development

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The connection between freight and the key transportation-reliant industries identified above relates directly to the implementation of the Missouri Strategic Initiative for Economic Growth. MoDOT is partnered with the Missouri Department of Economic Development, Missouri Department of Agriculture, and other organizations to implement economic strategies focused on certain industries, including advanced manufacturing, transportation and logistics, and biosciences (which include plant and agriculture technology and companion and feed animal sciences). This Freight Plan directly addresses the Initiative's strategy, "Missouri will provide the infrastructure necessary for companies and communities to be successful."

Economic Development and District Freight

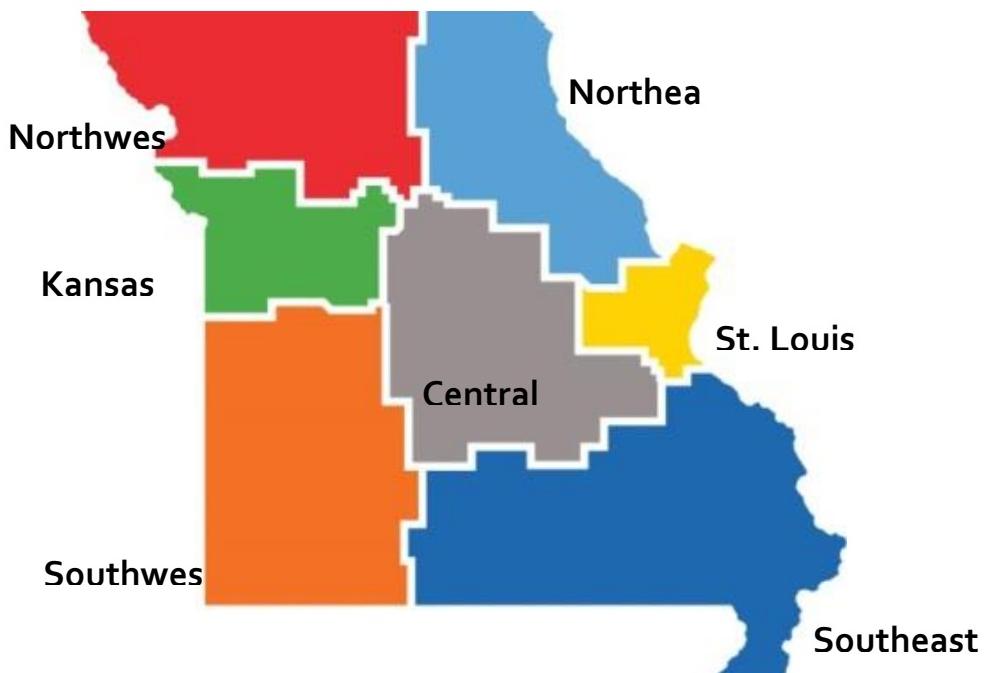
Missouri's freight system is also important for economic development and the District economies in the State (see **Figure 6-9**). Global trade and new technologies continue to transform the economy, redefining the way businesses

operate, challenging supply chains and transportation networks, and creating new customer opportunities for Missouri businesses. Businesses and their employees are more dependent than ever on integrated, agile, and efficient transportation networks to sustain economic competitiveness and connections to markets.

To compete in this global marketplace, businesses must optimize every asset—workforce skills, competitively

priced products, and reliable transportation systems—to ensure their customers receive quality goods and services when they expect them. As the importance of trade and the demands of customers continue to evolve, Missouri companies often find freight an increasingly important factor in sustaining and enhancing their competitive position in the marketplace. Freight supports the domestic and international trade of Missouri businesses, and supports State and local economic development and job growth.

Figure 6-9: Missouri Freight Districts



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Freight transportation represents a key competitiveness factor for businesses in every region of Missouri as they compete not only on product quality and cost, but also on the reliability and timeliness of product deliveries. Each of the regions in Missouri has specific attributes related to freight movement:

- **Kansas City District** – The Kansas City region is the second largest rail hub in the nation. It is the second largest export market in the State. Of the top 100 freight generators, 23 are located in the region. Kansas City also has the 45th busiest freight airport in the nation and the greatest concentration of intermodal facilities in the State.
- **St. Louis District** – The St. Louis region is the third largest rail hub in the nation. It is the largest export market in the State. Of the top 100 freight generators, 35 are located in the region. St. Louis also has the 53rd busiest freight airport in the nation and is the largest inland port.
- **Central District** – Central Missouri has 7 of the top 100 freight generators in the State. As a central location for the State's two longest interstates, it also includes several truck facilities. The region has the only ports on the Missouri River between St. Louis and Kansas City. The region provides critical freight support for agricultural industries and for excavation industries such as sand and gravel.
- **Northeast District** – Northeast Missouri has 4 of the top 100 freight generators in the State. It also has the northernmost port in Missouri on the Mississippi River at Lewis County. This region would benefit from improvements to the lock and dam system on the Mississippi River. Notable industries that rely on freight include chemical manufacturing, agriculture, and food processing.
- **Northwest District** – Northwest Missouri has 7 of the top 100 freight generators in the State. The emerging port at St. Joseph would be the northernmost Missouri port on the Missouri River. This region provides critical freight support for agricultural industries.
- **Southeast District** – Southeast Missouri has 5 of the top 100 freight generators in the State. With four active Mississippi River ports, it provides critical water freight opportunities, particularly for container-on-vessel and with the Panama Canal expansion. Energy-related industry concentrations in the region are dependent on freight.
- **Southwest District** – Southwest Missouri has 19 of the top 100 freight generators in the State as well as the 104th busiest freight airport in the nation. The region's proximity to major freight operations in Northwest Arkansas presents unique opportunities. Advanced manufacturing is a fast-growing regional sector, along with warehousing and distribution and food processing.

System Weaknesses and Economic Costs

Since approximately half of Missouri's economy is directly or indirectly affected by freight, the current and emerging weaknesses in Missouri's freight system can affect approximately half of the Missouri economy. The effects of congestion, safety concerns, issues with first and last mile connectors, and the performance of system operations/intermodal facilities can be correlated with economic impacts.

Chapter 6 – Economic Context of Freight

Congestion

Congestion costs freight transportation service providers and transportation users in several ways, including:

- It can cause lost hours by drivers and equipment stuck in congestion. This includes costs for hourly wages, wasted fuel, and idle equipment, and these costs are then passed on to shippers and consumers.
- Inability to meet delivery and production schedules results in costly delays of production. Congestion disrupts industry supply chains. Some industries measure in minutes the downtime costs due to lack of products and inputs—time matters.
- Congestion creates costs due to lack of system reliability, which is the ability of shippers to accurately predict the length of time to ship and receive goods and inputs. All freight modes and supply chains can have reliability issues, often related to congestion. As a result, additional inventory must be stored to address potential shortages and shippers must account for extra time in planning production and delivery schedules.

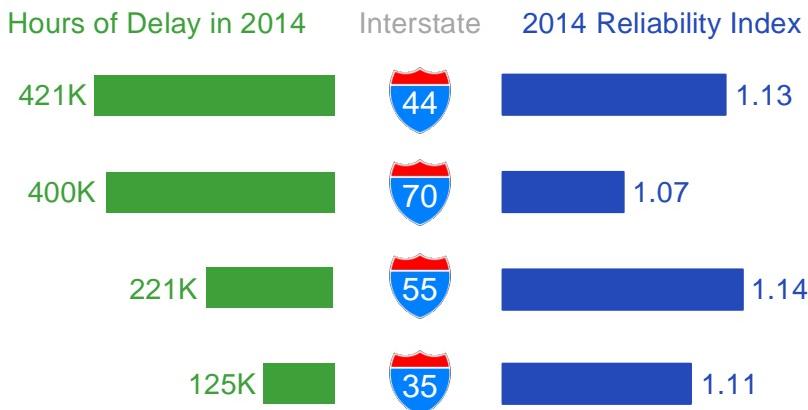
MoDOT is tracking truck congestion by measuring annual hours of truck delay and a truck reliability index. Annual hours of truck delay and a truck reliability index are measures proposed in the *Moving Ahead for Progress in the 21st Century Act* (MAP-21) and finalized in the *Fixing America's Surface Transportation (FAST) Act* to measure national freight performance.

Delay is measured anytime trucks experience congestion, defined in this case as when speeds drop to below five miles per hour below the posted speed limit. These delays impact the cost of goods and reduce business's ability to compete on a global scale.

The reliability index is a measure of how consistent truck travel times are on a corridor. The closer the index is to 1.0, the more reliable the corridor. Shippers and freight carriers require predictable travel times to control transportation costs and remain competitive. **Figure 6-10** illustrates hours of delay and reliability index on key Missouri interstate routes.

Chapter 6 – Economic Context of Freight

Figure 6-10: Hours of Truck Delay and Truck Reliability Index



On the index, a reliability of 1.0 is goal for major roadways.

Safety

As identified in Chapter 5, Missouri has shown strong improvements related to freight safety in recent years. However, funding constraints may hamper this progress. Freight safety affects the economy in several ways:

- Crashes resulting in injury or loss of life are immensely costly for individuals and to the overall economy due to medical costs and the loss of productivity of the individuals involved and their families.
- Freight-related crashes result in damaged equipment and damaged loads, costing shippers and haulers.
- Crashes often result in short-term congestion and bottlenecks that affect the reliability of the freight network.

First and Last Mile Connectors

The Missouri Freight Network identified in Chapter 3 includes several National Highway System intermodal connectors and first and last mile connectors that are crucial to Missouri's freight system. These connectors are the last roads that join the highway system to intermodal facilities, terminals, ports, airports, and major freight generator sites. Often, these connectors include local roads and interchanges between highways and local roads. If these connections aren't efficient due to lack of capacity, traffic conflicts, poor intersections, safety issues, or poor maintenance, then the connections can have an adverse economic impact.

Chapter 6 – Economic Context of Freight

System Operations and Intermodal Facilities

Chapter 5 identified several potential issues with freight system maintenance and connectivity that could affect the economic performance of the system and/or result in missed economic opportunities. A poorly maintained system results in greater delays, rerouting, and even equipment damage that cost freight haulers and shippers. Similarly, opportunities may be missed to take advantage of growing trade conditions, Panama Canal expansion, and container-on-vessel (COV.) if Missouri does not have strong intermodal connections, particularly to ports and rail lines.

Chapter 7 - Freight Policies, Strategies, and Institutions

KEY POINTS

- MoDOT has established a reputation for working with public and private freight stakeholders to support its multimodal freight system. Maintaining and developing these mature relationships will be critical to Missouri's economic future.
- Selecting freight projects that are important both regionally and statewide will become increasingly difficult in the future as freight tonnage increases and transportation revenues decline. One of the most principle products of this Freight Plan is to provide a robust methodology for evaluating and prioritizing potential freight investments.
- The lack of flexibility in using State and Federal funds limits Missouri's ability to use innovation or multimodalism to address freight challenges.

Introduction

To develop implementable strategies that will support Missouri's freight transportation system for years to come, it is important to understand the policy environment in which the freight system functions. Funding programs, freight-related institutions, freight roles and responsibilities, private infrastructure owners, statutory and constitutional constraints, and regional freight planning activities all create the framework for implementation.

Context for Policy Making

Missouri's economic future relies on the ability of the multimodal transportation system to support an increasingly complex supply chain. Recognizing this, the Missouri Department of Transportation (MoDOT) is focused on improving the freight transportation system. The Missouri State Freight Plan is designed to support this effort to build a freight network that will support Missouri's future success.

To accomplish this, the Freight Plan must be an actionable and implementable document. A critical step in building an implementable plan is to understand the overall framework of and relationships among MoDOT's partners in the freight transportation system. Providing context for the current policy

Chapter 7 – Freight Policies, Strategies, and Institutions

environment will lay the groundwork for identifying strategic steps MoDOT can take to achieve its goals and objectives.

Long Range Transportation Plan Goals

In 2014, Missouri's Long Range Transportation Plan established a vision for Missouri's transportation future. This vision was molded from over 12,000 public and stakeholder ideas. The vision is expressed in four goals and their corresponding implementation strategies. While each goal has individual qualities, all are related and interconnected. The goals are:

- **Maintenance** – Take care of the transportation system and services we enjoy today
- **Safety** – Keep all travelers safe, no matter the mode of transportation
- **Economic Development** – Invest in projects that spur economic growth and create jobs
- **Connections and Choices** – Give Missourians better transportation choices

National Freight Policy Goals

When the *Moving Ahead for Progress in the 21st Century Act* (MAP-21) was passed in 2012, it transformed legacy surface transportation programs into a unified program that focuses on performance and outcomes. States are encouraged to invest in projects that support national goals. Among these goals is "to improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development." To support this goal, MAP-21 requires the U.S. Department of Transportation (U.S. DOT) to develop a National Freight Policy that supported the following seven National Freight Policy Goals.

- Economic competitiveness
- Safety, security, and resiliency
- State of good repair
- Advanced technology
- Performance and accountability
- Economic efficiency
- Environmental

The *Fixing America's Surface Transportation (FAST) Act* requires states develop freight plans that support the National Freight Policy Goals. This Missouri State Freight Plan has been developed to meet the FAST Act Statewide Freight Plan requirements and in close collaboration with public and private sector partners. It identifies a multimodal freight network in which Missouri can make strategic investments to support the State and national freight goals. Chapter 1 discusses how the Missouri State Freight Plan goals and objectives will help achieve the national goals.

Performance Measures

Performance measures are an important way to monitor progress towards achieving the goals of the Missouri State Freight Plan. Likewise, performance measures can be an effective means of communicating future freight needs to decision-makers and stakeholders. Currently MoDOT uses a

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quarterly publication, Tracker, to report the performance of the State’s transportation system. Many of the existing Tracker metrics can be easily translated to measure the established State Freight Plan goals. Chapter 4 provides additional freight-specific measures that could be used to provide a more comprehensive view of multimodal freight system performance.

Critical Partnerships for Success

MoDOT’s future success as a national freight leader will be due largely to its history using partnerships to drive the development of the State’s overall transportation system. Missouri was among the first states to create regional planning commissions to help drive transportation decision-making. Today, this has resulted in a robust, grassroots-driven transportation program that is unrivaled among its peer states. Similarly, MoDOT established a reputation for working with public and private freight stakeholders to support its multimodal freight system. Maintaining and developing these mature relationships will be critical to Missouri’s economic future.

Modal Partners

MoDOT’s modal partners manage airports, freight railroads, pipelines, water ports, and inland waterways. Transportation professionals, who specialize in particular freight modes, are best suited to lead and manage their respective freight modal specialties. These key partners understand customer needs, the unique cost model of their respective mode¹, and how to best balance these key factors.

Airports

The Missouri aviation system includes 99 public use general aviation and 12 commercial airports.¹ These commercial airports include Kansas City International, Lambert – St. Louis International, and Springfield-Branson National. Each airport authority is a vital stakeholder and partner in the development of air cargo facilities and the infrastructure required to support this underutilized freight mode. Improvements to freight significant airports are largely funded through the Aviation Trust fund and from landing fees at the individual airports.

¹ 2012 Missouri Statewide Airports Economic Impact Study

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Freight Railroads

Missouri serves as a major rail junction point between the east and west coast Class I railroads. Missouri has the second (Kansas City) and third (St. Louis) largest rail hubs in the nation. Together these two hubs serve as major interchange points for the two west-based and the two east-based Class I railroads as well as interchange points for rail freight moving on North-South rail corridors to/from Canada and Mexico.

In total, six Class I railroads cross Missouri. Additionally, local and switching/terminal railroads provide critical connections to local industries that might not receive service from the larger Class I railroads. Missouri's railroads serve an important role in the State's ability to be responsive to future freight growth. However, the Class I railroads are privately owned and, while MoDOT has regulatory authority concerning grade crossings and safety, they are not regulated by a Missouri State agency.² Instead they are heavily regulated by multiple federal agencies.

All major railroads that transverse Missouri are private companies. As such, the majority of capital investment made in terms of new, upgraded and properly maintained infrastructure is funding by the railroads themselves. However, it is important to note that there has been increasing public investment in Missouri and across the nation to alleviate major chokepoints and develop corridors for intermodal container transport.

Pipelines

Much like railroads, pipelines are privately owned and not regulated by MoDOT. Pipelines are a critical piece of the Missouri freight system and are regulated primarily at the federal level by the Pipeline and Hazardous Materials Safety Administration (PHMSA). Approximately 10,700 miles of pipelines move natural gas, crude oil, and petroleum products throughout Missouri. At the State level, the Missouri Public Service Commission regulates the safety of the State's six investor-owned natural gas companies' operations.³ Pipelines are privately held infrastructure, but because of importance to the national economy there are opportunities to receive federal assistance for the construction of new pipelines (Example: Loan guarantees from U.S. Department of Energy)

Water Ports

Missouri's port authorities are important connection points to the underutilized inland waterway system. As freight volumes continue to increase and traditional freight transportation modes begin to exceed capacity, the ports' importance will only grow. Many ports are preparing for this influx of freight volumes by laying the groundwork for container-on-vessel (COV) activities and by adding infrastructure to handle multiple commodity types.

MoDOT's waterways unit assists cities and counties in forming port authorities, promoting the use of navigable waterways in the State, assisting in capital and administrative funding, providing information related to ports and waterways, providing technical assistance, and representing the interests of the 14

² Short lines and other intrastate railroads are regulated by the State of Missouri.

³ http://primis.phmsa.dot.gov/comm/reports/safety/MO_detail1.html?nocache=9244

<http://psc.mo.gov/CMSInternetData/ConsumerInformation/A%20Snapshot%20of%20What%20We%20Do.pdf>

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public ports in Missouri. In past years, the State has funded capital improvements at the state's port facilities. However, inconsistency in appropriated funding levels makes it difficult for ports and MoDOT to plan or leverage available funding.

Inland Waterways: U.S. Army Corps of Engineers/Maritime Administration

The U.S. Army Corps of Engineers (USACE) is responsible for maintaining the navigability, channel, and lock and dam system along the Mississippi and Missouri Rivers. The USACE Northwestern and Mississippi Valley divisions lead improvements in and maintenance of the locks and dams as well as perform dredging and other solutions to sedimentation problems in order to maintain the channel and harbors at public ports. While the Inland Waterway system is maintained by the US Army Corps of Engineers (USACE), the level of funding to adequately maintain and improve this system is somewhat limited by congressional appropriations and the lack of flexibility from other forms of federal aid.

While USACE is the federal agency responsible for the physical inland waterway system, USDOT's Maritime Administration (MARAD) administers the marine highway system. This national maritime freight network includes marine highways on the Missouri River (M-70 and M-29) and Mississippi River (M-55 and M-35). MARAD funds state and locally driven projects to offer water-based modal alternatives to freight normally transported by trucks on the nation's interstate system.

Organizational Partners

MoDOT's organizational partners include planning organizations, economic development organizations, and State agencies.

Regional Planning Commissions/Metropolitan Planning Organizations

MoDOT has a long history of working with regional planning organizations to plan transportation improvements. The State is divided into 19 Regional Planning Commissions (RPCs). The formal responsibility of each RPC is as varied as the region it represents. However, every RPC is an actively engaged partner in the transportation planning process.

Missouri has nine Metropolitan Planning Organizations (MPOs). Federal law requires the creation of MPOs to carry out transportation planning, programming, and project coordination in urbanized areas that have a population greater than 50,000. It is important to note that portions of the State that are included within MPOs are still considered inside their respective RPC areas. Some MPOs, like the Mid-America Regional Council (MARC) and East-West Gateway Council of Governments function as both an MPO and an RPC.

MPOs that serve regional populations greater than 200,000 are also considered Transportation Management Areas (TMAs). TMAs receive federal funds for projects selected by the MPO. Missouri has four TMAs:

- Mid-America Regional Council (Kansas City area)
- East-West Gateway Council of Governments (St. Louis area)
- Ozarks Transportation Organization (Springfield area)
- Northwest Arkansas Regional Planning Commission (McDonald County area)

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While all of Missouri’s MPOs and RPCs consider the impact and importance of freight to their regions, the Kansas City and St. Louis MPOs have the most mature freight planning programs. Each has completed regional freight plans. As freight volumes continue to increase dramatically, partnerships among MPOs, RPCs, and MoDOT will be increasingly critical to the freight system.

Economic Development Organizations

The Missouri Department of Economic Development (DED) works as the State facilitator assisting private companies in identifying locations and financial incentive structures to attract, retain, and expand targeted industries in Missouri. The DED has identified eight targeted industries in which to focus its business retention and expansion efforts:

- Transportation and logistics
- Automotive suppliers
- Biosciences
- Information technology
- Energy solutions
- Advanced manufacturing
- Health sciences and services
- Financial and professional services

The transportation and logistics industry was identified as one of the eight targeted industries; however, the other seven targeted industries rely on the transportation and logistics industry (and the multimodal freight system) to support continued growth. For this reason, the DED has stated that Missouri’s extensive transportation infrastructure is critical to the continued success of the State.

In addition to the DED, several other economic development organizations work to improve the State’s economy and grow the workforce.

In 2007, the Missouri Partnership, a non-profit public/private economic development organization was formed to work with State, regional, and local economic development agencies to support economic development in the State. The Partnership also identified transportation and logistics as a key industry.

A similar organization, the private Missouri Chamber of Commerce, represents more than 4,000 employers who supply over 425,000 Missouri jobs. The Chamber provides representation before the Missouri General Assembly and offers tools to help businesses grow.

KC Smart Port is a non-profit economic development organization covering the 18-county, bi-state Kansas City region. The organization’s focus is to drive economic development in the region’s transportation and logistics industry. The organization also strives to improve supply chain data and cargo security in the region through the Trade Data Exchange (TDE) initiative. In addition, KC Smart Port works to provide additional business services focused on aiding businesses in moving goods to the area.

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Other State Agencies

The Missouri Department of Public Safety State Emergency Management Agency (SEMA) is responsible for planning and training related to hazardous material emergencies—including those related to transportation-related incidents—through its Missouri Emergency Response Commission (MERC) and Local Emergency Planning Commissions (LEPCs).

The Commercial Vehicle Enforcement (CVE) Division of the Missouri State Highway Patrol is responsible for enforcement of laws and regulations related to commercial vehicles in the State. There are currently 24 fixed-scale sites and 25 portable scales in the State. In addition, Missouri uses weigh-in-motion technology called PrePass. The CVE also has 32 CVE Troopers who are certified to perform safety inspections.

Professional Organizations

Transportation-related professional organizations in Missouri, including those specifically related to freight transportation such as the Missouri Railroad Association, the Missouri Trucking Association, Missouri Port Authorities, and the Pipeline Association of Missouri, provide important professional training, information, and assistance to the freight transportation industry in the State. The members of these organizations can provide important insight into the state of freight transportation in Missouri.

The Council of Supply Chain Management Professionals (CSCMP) is a national professional organization with strong local presence in the St. Louis and Kansas City regions. The organization offers educational sessions and networking to members and non-members interested in supply chain issues.

Multijurisdictional Partnerships

Missouri is a connector state, which means the majority of freight moving across the State's transportation networks is pass-through traffic. As such, MoDOT participates in many multijurisdictional partnerships to support Missouri's multimodal freight system. For example, with the growing truck volume along I-70, MoDOT partnered with the Indiana, Illinois, and Ohio DOTs to evaluate the feasibility of dedicated truck lanes along the I-70 corridor from Kansas City to the Ohio/West Virginia border.

The Mid-America Freight Coalition (MAFC) is a 10-state coalition in the Midwest with a mission to support the economy of the region by working to ensure that freight can move reliably, safely, and efficiently within and through the region. Similarly, the Institute for Trade and Transportation Studies (ITTS) in the southeast is a nine-state partnership that assists members in improving freight mobility and international trade. This group evolved from the Latin American Trade and Transportation Studies, which worked to improve trade and freight movement between the Midwest and Southeast regions. Missouri is a member of both the MAFC and ITTS.

Missouri is a member of the Mid-America Intermodal Authority Port (also known as the Mid-America Port Commission) which serves as a port commission for the northeast portion of Missouri and

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bordering areas in Illinois and Iowa. The group is charged with developing ports, supporting facilities, and overall economic development within a 13,000-square-mile area.⁴

The St. Louis Port Working Group includes freight partners from Illinois and Missouri who are focused on improving freight movement, activities, and efficiencies within the Port Authority of the City of St. Louis. While the City administers the port, the working group focuses on improving freight in the larger metropolitan areas (including Illinois and Jefferson County).

Project Selection and Funding

Each of MoDOT's seven District offices is responsible for maintaining the State and interstate roadway mileage within its jurisdiction. In collaboration with the RPCs and MPOs, the districts are also responsible for most of the project selection and delivery within each region. This leads to a decentralized system in which freight projects are primarily selected by regional needs. This process has been effective.

However, selecting freight projects that are important both regionally and statewide will become increasingly difficult in the future. By 2030, total freight tonnage in Missouri is expected to increase by more than 37 percent. To account for this growth and to maintain the system, over \$65 million worth of project needs are identified in this Missouri State Freight Plan (see Chapter 9). However, transportation funds continue to decline. Missouri's Long Range Transportation Plan only identified \$14.4 billion available to fund projects for the *entire* Missouri transportation system. This Freight Plan is prepared, in part, to support transportation investment decision-makers as they face the tough decisions that will be required in the future.

To aggravate these challenges even further, the limited funding is subdivided into several small funds. Most of the funds are either constitutionally or statutorily limited to certain eligible project types. The lack of flexibility among these funds potentially limits the ability to use innovation or multimodalism to find the best and most cost-effective solutions to address Missouri's freight challenges.

State Road Fund

Missouri created the State Road fund to receive the first Federal-Aid Road funds in 1917. Today, this account is funded by Federal Highway Administration (FHWA) reimbursements, licenses, permits, and fees for motor vehicles and drivers; State sales tax on motor vehicles; cost reimbursements; and other miscellaneous fees. Expenditures from this fund are constitutionally limited to State highway projects (and supporting activity).

State Highways and Transportation Department Fund

The State Highways and Transportation Department Fund (commonly referred to as the highway fund) is funded by the motor fuel tax and licenses, permits, and fees for motor vehicles and drivers. The current State motor fuel tax (gasoline, gasohol, and diesel) is 17 cents per gallon. The last increase in

⁴ <http://www.midamericaport.com/history/>

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the State motor fuel tax was in 1996. Similar to the road fund, the highway fund can be used only for costs associated with State highway projects and the enforcement of motor vehicle laws and traffic laws.

State Transportation Fund

The State Transportation Fund is funded by one percent of the overall 4.225 percent State sales tax on motor vehicles. Unlike the highway and road funds, the State transportation fund is limited to non-highway investment. It can be used to invest in air cargo, railroads, ports, and waterway projects. Most recently, this fund has been used to create the Freight Enhancement Program and provide funds for the administration, planning, and development of local port authorities. The Freight Enhancement Program funds freight projects that improve the efficiency of freight between two modes, excluding highways.

Port Capital Improvement Program

The Port Capital Improvement Program was established to fund transportation-related capital projects at Missouri's local public port authorities. The program is funded by annual General Revenue allocations. However, funding has been very sporadic. While \$3 million was available in 2014, funding was unavailable between 2010 and 2013. It was recently announced by the Governor's office that 2015 funds will be restricted due to revenue shortfalls. The inconsistency in funding makes it difficult to plan and/or leverage these funds.

Aviation Trust Fund

The Aviation Trust Fund is 100 percent user-funded through a fee on aviation fuel and a portion of the State sales tax collected on jet fuel. The fund is used to match the Federal Aviation Administration's Airport Improvement Program (AIP). The program provides funding to public use airports across the State. In particular, commercial airports receive funds based on the number of annual passenger boardings and on the landed weight of air cargo. Expenditures from this fund are limited to maintenance of AIP-eligible runways, taxiways, and aprons and for emergency repairs on safety-related items.

Grade Crossing Safety Fund

MoDOT has a long-standing partnership with the railroads to improve grade crossings across the State. The State's 3,800 public grade crossings are evaluated and ranked by a hazard exposure index. Annually, MoDOT uses this index to select 30 to 35 grade crossings to be improved using federal safety funds and Missouri's Grade Crossing Safety Account. The account receives funding from a State motor vehicle licensing fee. Since 1996, the program has resulted in an estimated 81 percent decrease in crashes.⁵

⁵ http://www.modot.org/plansandprojects/construction_program/STIP2012-2016/documents/Sec07_MultimodalOperations.pdf section 7-12

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Railroad Expense Fund

The Railroad Expense Fund is funded by assessments collected from intrastate railroads for the expenses of regulation. The fund is devoted to the payment of expenditures incurred by state agencies for the regulation of railroads.

State Transportation Assistance Revolving (STAR) Fund

The STAR Fund was established to provide loans to political subdivisions (local governments) of Missouri and not-for-profit organizations to develop non-highway related transportation projects. Each loan has been generally limited to \$1 million. While the program funds waterway, railroad, and mass transit projects, the majority of the loans have been used to support small general use airports, where they have been used to build hangars and other small projects not eligible for funding through the Aviation Trust Fund.

Federal Funding Limitations

Federal funding has clear limitations. While USDOT has embraced multimodalism on the whole, funding programs are still administered by mode. Furthermore, many programs are very specific on their applicability and present the same lack of flexibility as state funding.

For example, USACE is charged with maintaining the Missouri and Mississippi Rivers' locks and dams, channel depth, and navigability. However, USACE is not enabled to make necessary changes because Congressional priorities are on traditional surface transportation projects. Likewise, funding from other modal administrations that serve the same general purpose cannot be used to invest in maritime improvements. This is particularly challenging for the aging lock and dam system that can shut down all movement on a river if the system fails.

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Complexity in Freight Planning

Freight planning is among the most complex activities that MoDOT undertakes. MoDOT is tasked with supporting and expanding a multimodal freight system that, in some cases, is outside MoDOT's jurisdiction or MoDOT is statutorily limited in its ability to fund. All while overall transportation funds continue to dramatically decline. MoDOT has succeeded in navigating these complexities in the past. This is particularly crucial because a freight strategy will not work without the coordination and support of all aspects of MoDOT and its freight partners.

MoDOT is charged with several freight-related tasks:

- Build, maintain and operate over 33,000 miles of roads and over 10,000 bridges
- Permit, regulate, and enforce commercial vehicle laws (including commercial vehicle weight) and development state enforcement plan
- Regulate railroad safety and intrastate railroad companies
- Administer airport funding
- Administer State funding for public port authority administrative and capital budgets

Because of the long history of partnerships throughout the State to accomplish these tasks and to support and enable public and private partners, MoDOT is the natural leader to champion the future of the Missouri multimodal freight system. With this in mind, the Missouri State Freight Plan establishes a series of strategic recommendations and tactics for MoDOT to guide its future work.

Strategic Recommendations

It is critical to the State's economic future that the Missouri State Freight Plan be an actionable and implementable plan. To accomplish this, 14 strategic recommendations were developed to support the freight plan's goals, listed in **Table 7-1**. The recommendations include broad-based policies and programs, as well as projects and studies that will help MoDOT overcome challenges documented in the plan and capture future economic opportunities. Each of the strategic recommendations are supported by a series of implementation tactics (see Chapter 9) that can serve as a potential "to-do" list for MoDOT officials as they work day-to-day to execute the plan. While some of the tactics are long-term projects, several are immediately actionable.

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Table 7-1: Potential Strategies to Achieve Goals and Objectives

Strategic Policy Recommendations	Missouri State Freight Plan Goals and Objectives			
	Maintenance	Safety	Economy	Mobility and Connectivity
Work with MoDOT internal and external partners to improve multimodal connectivity			✓	✓
Focus on maintaining a state of good repair of the multimodal system	✓		✓	
Cultivate a long-term focus to develop comprehensive freight corridors	✓	✓	✓	✓
Take a pragmatic approach to highway system capacity expansion, given financial constraints	✓		✓	✓
Improve the availability of truck parking		✓		
Enhance the resiliency and maintain flexibility of the multimodal freight system to adapt to quickly changing needs	✓	✓	✓	✓
Improve multimodal safety	✓	✓	✓	✓
Improve the health, safety, and welfare of truck drivers	✓	✓	✓	✓
Capitalize on the momentum created by <i>Freight on the Move</i>	✓	✓	✓	✓
Invest in freight infrastructure and operational improvements to drive long-term job creation			✓	
Enhance Missouri's ability to export goods			✓	✓
Expand interagency collaboration and coordination	✓	✓	✓	✓
Use technology to improve freight movement	✓	✓	✓	✓
Develop opportunities for maritime and air cargo			✓	✓

Chapter 8 - The Decision-Making Process

KEY POINTS

- One of the most important products of this Missouri State Freight Plan is a consistent process to prioritize freight investments (projects).
- The process incorporates the needs and conditions of all freight modes as well as land use, economic development, safety and economic impacts to rank projects based on criteria that reflect the Freight Plan goals.
- Stakeholder input helped shaped the prioritization process so that process reflects what matters most to the people and businesses of Missouri.

Introduction

Fewer dollars are available to preserve and maintain the existing freight transportation system and meet the increasing freight demands of Missouri's businesses. This Missouri State Freight Plan defines a prioritization process to provide information that will help decision-makers choose the strategic freight investments that best support the transportation goals of the State.

The Need to Prioritize Projects

Freight transportation represents a key economic competitiveness factor for Missouri. Companies depend on the efficient and cost-effective movement of materials, components, and finished goods to and from their operations. As the transportation needs of businesses and their customers continue to evolve, companies are more dependent than ever on an integrated and reliable multimodal freight transportation network. Today, Missouri businesses and industries compete not only on the basis of product quality and cost. Their transportation networks must provide reliable connections to customers, access to diverse domestic and international markets, and ensure timely deliveries that meet or exceed the consumer's expectations.

Chapter 8 – The Decision-Making Process

The transportation assets that make up Missouri's freight network are critical to the State's economy. If the freight network fails, the economy will fail. Funding for transportation is seriously constrained; as a result, funding for investments needed to sustain the existing freight network and provide additional capacity to meet the increasing freight volumes may not be available. Decision-makers are faced with fewer dollars to preserve and maintain the existing transportation system and meet the growing freight demand required to support Missouri's businesses.

To help decision-makers make the best strategic investment choices, a freight project prioritization process was developed. This prioritization does not take the place of the decision-maker's assessment; rather, it is an additional tool to aid in the evaluation of future freight projects. The project prioritization process was designed to help identify projects that will best support the safety, connectivity, and mobility of the Missouri Freight Network and promote economic development and prosperity for Missouri's people and businesses.

Implementation of this prioritization process will help ensure Missouri's multimodal freight network remains a distinguishing feature of the State's economic success.

Inputs to the Prioritization Process

The prioritization process builds upon and reflects the goals and performance measures identified in Missouri's Long Range Transportation Plan and this Missouri State Freight Plan, and incorporates input from hundreds of key stakeholders.

Chapter 8 – The Decision-Making Process

Freight Plan Goals

The prioritization process was developed to reflect the four goals of this Freight Plan. Projects were screened to ensure they were consistent with and would achieve progress towards one or more of the goals. These goals are:

- **Maintenance** – Maintain the freight system in good condition by keeping highways and bridges in good condition and supporting the maintenance of railways, waterways, airports, and multimodal connections.
- **Safety** – Improve safety on the freight system by decreasing the number and severity of crashes involving commercial vehicles and improving safety at railroad crossings.
- **Economy** – Support economic growth and competitiveness in Missouri through strategic improvements to the freight system.
- **Connectivity and Mobility** – Improve the connectivity and mobility of the freight system by reducing congestion and increasing reliability on the roadways; by supporting improved efficiency of rails, waterways, and airports; and by improving connections between freight modes.

Performance Measures

Performance measures are used across the transportation industry to evaluate transportation systems and agencies. The Missouri Department of Transportation's (MoDOT's) rich history in performance measurement and management is best exemplified by Tracker, the department's quarterly performance measure publication.

For the Freight Plan, performance measures were established to assist with plan development, implementation, and accountability. With Tracker as the foundation, and through consultation with the Freight Steering Committee made up of key stakeholders and MoDOT leadership, a limited number of strategic performance measures were identified for each of the four goals. These measures, summarized in **Figure 8-1**, provide insight into the project selection prioritization process by establishing how freight performance is and will be measured in Missouri.

Figure 8-1: Missouri State Freight Plan Performance Measures

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Freight Plan Goal	Recommended Measures
Maintenance Maintain the freight system in good condition	<ul style="list-style-type: none">Percent of the major highways in good condition*Percent of structurally deficient deck area on National Highway System bridges*
Safety Improve safety on the freight system	<ul style="list-style-type: none">Number of commercial vehicle crashes resulting in fatalities or serious injuries*Rail crossing crashes or fatalities*
Economy Support economic growth and competitiveness	<ul style="list-style-type: none">Goods movement competitiveness*Job and economic growth by key sector, including:<ul style="list-style-type: none">AgricultureManufacturingTransportation/Logistics
Connectivity and Mobility Improve the connectivity and mobility of the freight system	<ul style="list-style-type: none">Freight tonnage by mode*Annual hours of truck delay*Truck reliability index*

* These or similar measures have been established in MoDOT's Tracker

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The Freight Network

The Missouri Freight Network was designated to help decision-makers choose the best strategic investments for freight transportation. The Missouri Freight Network includes the significant statewide and multiregional transportation assets—highways, freight rail, intermodal facilities, ports, and airports—most critical to the movement of freight and goods in the State. The network was developed based on the Freight Plan goals and performance measures, and responds in part to *the Fixing America's Surface Transportation (FAST) Act Primary Freight Network and Critical Rural Freight Network*.

The top three tiers of the Missouri Freight Network, as discussed in Chapter 3, is the foundation of the state's multimodal prioritization process because they serve as the first screening filter in the project selection process. In order for a highway project to be considered it must be on the top three tiers of the highway network. This approach focuses freight investment decisions on the multimodal corridors that are most critical.

Freight Partners' Insight

Freight movement in Missouri is impacted by a number of public and private sector organizations, agencies, and businesses. It is, therefore, increasingly important to engage a broad cross-section of stakeholders in planning for the State's freight infrastructure. The prioritization process was developed with the help of key stakeholders who participated in freight forums, business forums, steering committee meetings, surveys, and webinars as part of the freight planning process.

Stakeholders offered varied perspectives on changing freight transportation needs, existing system conditions, critical domestic and international market destinations, and strategies to optimize the benefits of the multimodal transportation network. These insights were vital to establishing what matters most to the people and businesses of Missouri.

The Prioritization Process

As available funding for transportation becomes more constrained, decision-makers need better information to help make the most strategic investment choices. Project prioritization provides a reasoned approach to evaluating competing needs and conditions in order to identify transportation investments that best position Missouri to meet the freight needs of tomorrow. The prioritization process developed for the Missouri State Freight Plan, shown in **Figure 8-2**, incorporates all transportation modes as well as land use, economic development, safety, and economic impacts in order to rank projects based on criteria that reflect the Freight Plan goals.

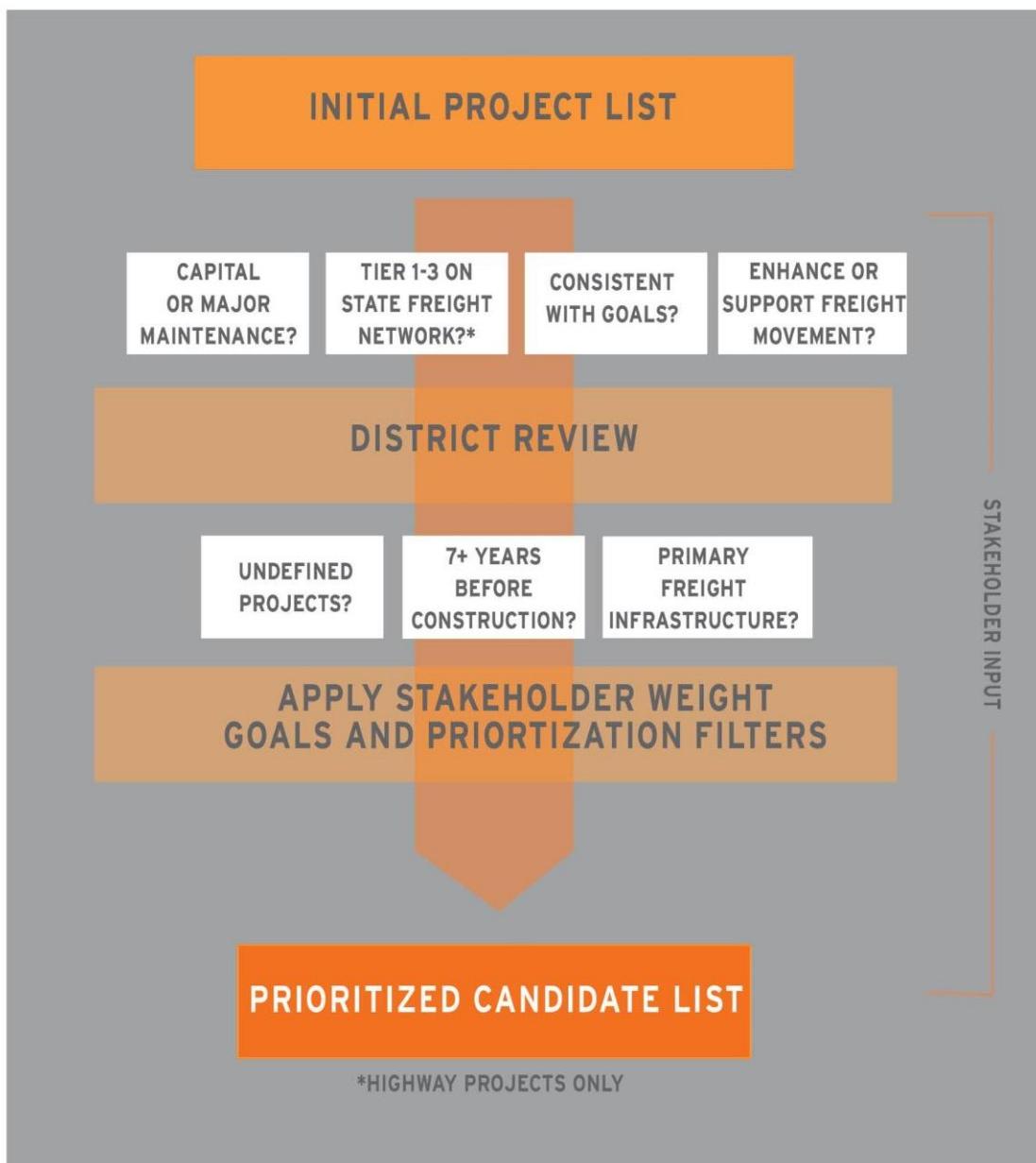
The Missouri State Freight Plan prioritization process included four steps:

- **Step 1** – The initial step evaluated and refined a list of potential projects. A three-tiered process was used to screen projects to determine which would be prioritized.
- **Step 2** – The second step in the prioritization process generated a gap analysis to identify projects that were missing from the initial list of potential investments. These were added to the project list.

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- **Step 3** – In step three, a prioritization framework was developed to define prioritization filters, project scoring factors, data sources, and scoring methodologies for each mode.
- **Step 4** – The last step in the process analyzed each project on the final list and produced a scoring classification for every project. Feedback from community stakeholders, MoDOT district staff, the Freight Steering Committee, and freight stakeholders was used to refine the final list of projects.

Figure 8-2: Project Prioritization Process



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Defining the Freight Projects

Determining an initial project list is an important step in any prioritization process. For the prioritization process, a potential freight project must fit in one of the following categories:

- **Freight focused** – The primary purpose of the project is to address a specific freight transportation need.
- **Freight related** – The primary purpose of the project is to address multiple transportation concerns, of which freight is one element.
- **Freight impacted** – The primary purpose of the project is to address general transportation needs; however, freight mobility may be positively affected.

The initial list of potential freight projects included 3,800 projects from across the State. These projects came from the Statewide Transportation Improvement Program, modal plans, Missouri's Long Range Transportation Plan, Metropolitan Planning Organization plans, freight forums, interviews, business forums, MoDOT district offices, and stakeholders and planning partners. A three-tiered process was used to refine the list of potential projects.

Tier one screening used four filters to refine the initial project list:

- Projects are located on, linked to, or within the prescribed buffer of the Missouri Freight Network (see Chapter 3).
- Projects are capital expenditure projects or major maintenance projects. Major maintenance projects are high-cost, replace-in-place projects; they do not include routine maintenance. General maintenance, operations, and planning projects were captured for further evaluation, but were not included in the prioritization process.
- Projects are consistent with the goals and the modes incorporated in the Freight Plan.
- Projects enhance and support the movement of freight.

The tier one screening process reduced the initial freight project list to approximately 480 projects.

In the tier two screening process, the remaining candidate projects were reviewed by each of the MoDOT district offices. Projects were added or deleted based on criteria determined by the districts. Participants at each of three business forums were asked to suggest additional projects, and these were added to the project list.

The tier three screening process identified projects that were determined to be speculative. Projects on the list were screened to remove:

- Projects with descriptions too general to define or locate
- Projects requiring 7 or more years before initiation of construction (a list of longer-term projects was captured for future consideration)
- Interchange projects that did not serve freight-related activities (based on the percentage of truck volumes on the primary corridors)
- Planning studies (planning projects captured from the project lists for future freight project studies are included in Chapter 9)

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- General maintenance projects
- Statewide planning projects
- Projects that did not support freight-related activities

At the close of this tier three screening process, approximately 122 projects remained on the project list. Projects deleted during the screening process were captured for consideration in the next generation of freight projects, and for further consideration as future planning and initial program review projects.

The Prioritization Framework

Once the list of 122 projects was compiled, prioritization filters and project scoring factors were used to evaluate and prioritize each project. Twenty-nine filters and project scoring factors were identified for the four freight modes (road, rail, water, air). The filters were the general criteria for prioritization while the scoring factors were how each filter was measured.

Filters were weighted to reflect the goals of the Missouri State Freight Plan—maintenance, safety, economic development, and connectivity and mobility. These filters were discussed in stakeholder meetings, and based on stakeholder feedback, several scoring factors were deleted from the prioritization process and other scoring factors were determined to be more important.

The economic impacts of freight activity in Missouri were calculated in a process that integrates TRANSEARCH® commodity information, an IMPLAN economic model for Missouri, and indirect and induced economic impacts.

The process used quantitative data when it was practical and available. Data for each transportation mode was collected from a number of sources including MoDOT, Federal Highway Administration, and reliable geographic information system resources, TRANSEARCH® data, the U.S. Census, and the U.S. Department of Commerce. Geospatial analysis was also incorporated into the process.

Tables 8-1 through **8-4** show the prioritization filters used for each of the four transportation modes included in the process.

Table 8-1: Highway Mode Prioritization Filters

Freight Plan Goal	Prioritization Filter
Safety	<ul style="list-style-type: none">• Reduces number of substandard bridges• Improves high truck crash location
Connectivity and Mobility	<ul style="list-style-type: none">• Improves bridges with vertical clearance or weight restrictions• Addresses freight bottlenecks• Improves multimodal connections

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	<ul style="list-style-type: none">• Improves capacity
Economic Development	<ul style="list-style-type: none">• Improves connection to top freight generators• Economic link scores
Major Maintenance	<ul style="list-style-type: none">• Project maintains existing freight network

Table 8-2: Freight Rail Mode Prioritization Filters

Freight Plan Goal	Prioritization Filter
Safety	<ul style="list-style-type: none">• Improves rail safety
Connectivity and Mobility	<ul style="list-style-type: none">• Adds capacity to improve rail bottlenecks• Improves vertical clearance• Improves rail access to intermodal or transload facilities
Economic Development	<ul style="list-style-type: none">• Improves rail access to ports• Improves rail access to freight generators• Improves rail access to certified industrial sites• Economic link scores
Major Maintenance	<ul style="list-style-type: none">• Project maintains existing freight network

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Table 8-3: Ports Mode Prioritization Filters

Freight Plan Goal	Prioritization Filter
Safety	<ul style="list-style-type: none">• 2013 port projects scoring includes projects that address all goals
Connectivity and Mobility	<ul style="list-style-type: none">• Establishes or improves rail-port intermodal facilities• Improves on-port facilities for increased throughput
Economic Development	<ul style="list-style-type: none">• Supports retention or expansion of business• Economic link scores
Major Maintenance	<ul style="list-style-type: none">• Project maintains existing freight network

Table 8-4: Aviation Mode Prioritization Filters

Freight Plan Goal	Prioritization Filter
Connectivity and Mobility	<ul style="list-style-type: none">• Improves access to air cargo facilities• Expands aviation freight services• Increases air cargo operations
Economic Development	<ul style="list-style-type: none">• Supports or expands aviation/land use for air cargo operations
Major Maintenance	<ul style="list-style-type: none">• Project maintains existing freight network

Results

Each project was classified as very high, high, medium, or low priority.

The prioritization process ranked 19 projects as very high priority; of which 14 were highway projects and five were rail projects. Most of the 19 projects addressed capacity and safety issues, and the remaining projects improved intermodal connectivity. Projects were located in five of the MoDOT districts or represented I-70 improvements to the statewide network. The estimated cost of these

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projects exceeded \$5 billion. (Note that costs for two significant I-70 statewide project segments were not available, and thus are not included in this overall cost information.)

The process ranked 34 projects as high priorities, and they represent all of the freight modes. Projects in this category addressed mobility and capacity needs, safety concerns, I-44 statewide improvements, modernization of air cargo facilities, and access to ports and industrial parks. These projects are located in all seven MoDOT Districts, and project costs range from \$300,000 to over \$2 billion. A list of projects is included in Appendix G.

This project prioritization process developed for the Missouri State Freight Plan can be reapplied in the future and can be modified as new resources, data, and needs are identified. The prioritization process can evolve over time to reflect the needs of business, freight stakeholders, and MoDOT.

Each year during development of the Statewide Transportation Improvement Plan (STIP) transportation needs are identified in conjunction with the planning partners. Projects that are ready for construction and have available funds are then programmed in the next STIP. MoDOT does not fully program years four and five of the STIP, therefore National Highway Freight Program (NHFP) funds are not 100% programmed in the latter years. Any freight-focused needs (funded or unfunded) identified through the STIP process, from partners and from system and network analysis are appended to the Missouri State Freight Plan Appendix G.

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KEY POINTS

- To make this Freight Plan actionable and implementable, fourteen strategic recommendations were developed to address the freight plan's goals and are supported by a series of implementation tactics.
- These recommendations include broad-based policies and programs, as well as projects and studies that will help Missouri overcome the challenges outlined in this plan and capture future economic opportunities.

Introduction

Missouri's freight network continues to be the foundation of the State's economic success. Freight supports jobs in freight-dependent businesses such as manufacturing, retail trade, agriculture, and tourism. For the most part, this transportation infrastructure was constructed many years ago. The cost to maintain the system continues to increase and the demands on the system continue to grow. To compete in the 21st century global economy, Missouri must find a way to make the strategic investments in its freight network that are necessary to support economic growth.

Smart programs, policies, and projects can help the Missouri Department of Transportation (MoDOT) continue to maintain and enhance the multimodal freight system upon which the State's economy depends. The strategies and recommendations presented in this Missouri State Freight Plan include major investments in freight transportation infrastructure, as well as low-cost programs and policies designed to enhance freight operations and freight-supported economic development in the State.

Program Recommendations

The following is list of program recommendations developed for the Missouri freight transportation system. Each recommendation can be implemented as a stand-alone initiative.

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However, there are synergies among these initiatives and when implemented in a collective manner the effectiveness may be magnified.

Maintain and improve the designated Missouri Freight Network to ensure the freight system continues to move toward achieving the transportation goals identified in the Missouri Long Range Transportation Plan and the Missouri State Freight Plan. The proposed freight network is identified in Chapter 3. An initial list of prioritized freight projects is discussed later in this chapter and included in Appendix G. Missouri needs to further evaluate alternative funding and financing sources to ensure the Missouri Freight System is preserved and maintained, and critical high priority improvements are implemented. Chapter 10 includes some starting points for this analysis. For modal investments planned for, owned by, and maintained by private businesses, MoDOT should continue to work with these private businesses to ensure the State's multimodal freight network supports the ongoing needs of the State's businesses and residents.

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Use MoDOT's freight project prioritization framework to help decision-makers prioritize future investments on the freight network. Under the *Moving Ahead for Progress in the 21st Century Act* (MAP-21), states are directed to identify freight projects in a statewide plan. The MoDOT freight prioritization process, developed as a part of this Freight Plan, provides a framework for evaluating and prioritizing key multimodal freight projects using both quantitative and qualitative data and analysis. Chapter 8 describes this prioritization process in detail. This is the first-generation freight prioritization process for MoDOT; future refinements and additional quantitative data inputs may be incorporated over time to improve the process and enhance project evaluation.

Expand performance measures. MoDOT should continue to expand its Tracker performance measures and consider incorporating future data into the prioritization process. MoDOT should work with its modal offices to identify other freight data needed to support the prioritization process.

Expand ongoing collaboration with the Missouri Department of Economic Development (MDED) to address specific freight transportation needs of targeted industries. Identify clusters of targeted industries within the State and the transportation issues facing each industry sector. Work with MDED, Metropolitan Planning Organizations (MPOs), Regional Planning Commissions (RPCs), and regional economic development agencies to develop and fund projects that will address the transportation needs of these industry clusters.

Assist in developing freight and land use guidance. This guidance can facilitate creation of freight supportive land use policies and guidelines to ensure practical freight considerations are incorporated in local planning and design efforts, promote good neighbor development strategies for freight facilities, support safe practices, and help communities and local governments better understand how land use practices can improve freight and community development linkages.

Increase awareness about economic development and freight. Residents generally do not recognize the important role freight plays in their jobs, in the economic well-being of their communities, and in many aspects of everyday life. In order for elected officials to support increased investment in freight infrastructure, residents must recognize why these investments are important to them and to the State, and must appreciate the tangible benefits that would result from these investments. Education that clearly establishes the link between Missouri's freight system, the State's economy, and community sustainability is a key factor in future freight infrastructure funding. Integrating green initiatives and environmental quality in this discussion can also help address community concerns regarding social equity and quality.

Continue to engage the Missouri Chamber of Commerce, Missouri Economic Development Council (MEDC), Missouri Association of Manufacturers, private sector freight stakeholders, MPOs and RPCs, and related organizations. Ongoing stakeholder engagement can develop a public information exchange with MPOs, RPCs, planning organizations, economic development agencies, and other State, regional, and local groups about the role of freight transportation in the State and regional economy.

Host an annual Freight and Economic Development Roundtable. This program would enhance the exchange of information and communicate about current freight and

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development issues and opportunities. This effort would be in addition to the Freight Advisory Committee (FAC). It could offer an opportunity for small group roundtable discussions and presentations on key issues, and would promote broader understand regarding the links between freight and economic development.

Consider developing a public-private partnership program to facilitate development of freight infrastructure, terminals, and intermodal facilities. Public-private partnerships could be used for rail and intermodal facility improvements critical to the State but that may not solely align with private investment criteria. Funding from MoDOT would leverage targeted private investments in rail infrastructure to address significant freight rail capacity issues within the State and rail bridges at major river crossings.

Identify and preserve critical multimodal freight-intensive development nodes and adjoining industrial land assets. This companion program to the Missouri Certified Sites Program would focus on identifying and preserving key locations where strategic multimodal freight assets and available industrial land could be reserved for future freight-intensive development such as intermodal freight terminals and major manufacturing facilities including aerospace, automotive, and similar operations. One of the greatest challenges facing freight-intensive businesses today is the lack of suitable and available industrial land that is readily and efficiently served by freight infrastructure, particularly multimodal services. Often, land adjacent to valuable freight infrastructure has been developed for incompatible uses including retail, commercial, or even residential purposes.

Partner with agencies already involved in the Certified Site Program, including MEDC and regional power utility firms. MoDOT freight staff and private transportation partners could provide geographic information system data and valuable information from the Freight Plan to be integrated with site and non-transportation infrastructure data. If strategic freight-intensive sites are identified, these partners should work with State, local, and regional transportation and economic development partners as well as private partnerships to preserve freight-intensive sites. To help with this, planners can analyze the inventory of industrial land with proximity to strategic multimodal freight assets. This inventory can be used to develop a model Freight and Industrial Facilities Planning Guide to help planning organizations, cities and counties, developers, and economic development agencies identify freight supportive land use strategies and best practices. These land use strategies and best practices encourage better land use and development to accommodate the needs of freight-intensive businesses.

Policy Recommendations

A critical step in building an implementable plan is to understand the overall framework and interactions among the stakeholders who carry out the various aspects of Missouri's supply chains. This process started with an extensive outreach effort called *Freight on the Move*. While the outreach was underway, the MoDOT team evaluated current freight policies to identify the potential opportunities

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and shortcomings of the current system.

Based on this information as well as information from the Missouri Long Range Transportation Plan, three plausible but extreme future scenarios were developed to help the Freight Steering Committee evaluate and discuss the future of freight transportation in Missouri. Considering these alternate scenarios enabled MoDOT leadership and freight stakeholders to discuss trade-offs, nuances, and cause-and-effect relationships that would not be identified in a traditional planning process. By working through the alternate future scenarios, stakeholders identified common needs that are likely to be relevant no matter what the future may hold.

The three scenarios examined are shown in **Table 9-1**. Additional details are contained in Appendix F.

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Table 9-1: Future Scenarios Considered

SCENARIO

Hungry World

Global Market

Convenient Living

DESCRIPTION	Hungry World	Global Market	Convenient Living
	<p>Missouri will play a major role in feeding the ever-increasing world population (35% increase by 2050). As a top 10 agricultural producer in the United States, Missouri's role in feeding the world will continue to require changes in how freight moves.</p>	<p>The current global trend of re-shoring manufacturing will continue. Given Missouri's manufacturing sector's history, this would elevate Missouri's position in the global marketplace.</p>	<p>Freight movements will change as people drive considerably less—seeking to work from home and live in communities where they can walk to jobs, schools, and other services. For example, more shopping will be done online with increasing residential deliveries, resulting in the decrease of traditional shopping trips.</p>

The scenario planning results were used to guide further policy research and establish 14 strategic policy recommendations to support Freight Plan goals. These recommendations are shown in **Table 9-2**. Each recommendation is supported by a series of implementation tactics, designed as a potential to-do list for MoDOT and its freight partners. The tactics represent broad-based policies and programs as well as future projects or studies that Missouri should consider undertaking to position the State to capture future opportunities. Many of the tactics are long-term solutions, but several are immediately actionable. Tactics are grouped by realistic timeframes for implementation—short-term (0-2 years), intermediate (2-6 years), and long-term (6-10 years).

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Table 9-2: Strategic Policy Recommendations and Implementation Tactics

Implementation Tactics	Timeframe
Update Federal Highway Administration Functional Classification (attention paid to locating all intermodal connectors)	Short-Term
Partner with local governments and private partners to proactively manage the condition of intermodal connectors and connectivity points	Short-Term
Develop a program to educate local officials on the importance of intermodal connectors	Short-Term
Work with MoDOT districts to identify district staff members interested in cross-training in multimodal freight	Short-Term
Work with local officials to mitigate negative impacts of the projected increase in truck traffic volumes	Intermediate
Identify and close any first or last mile gaps near major manufacturing hubs and multimodal connectivity points	Intermediate
Ensure public investments in modal connectivity will connect and enhance logistical partnerships	Intermediate
Work with rail, marine, and air partners to share expertise and create cross-functional relationships to help identify non-highway projects and key connectors on the strategic freight network	Intermediate

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STRATEGY 2:

Focus on Maintaining a State of Good Repair of the Multimodal System

Implementation Tactics	Timeframe
Focus investment in corridors that exhibit a strong correlation between truck vehicle miles traveled and substandard pavement and bridge ratings on the Tier 1, 2, and 3 highway freight network	Short-Term
Mitigate disruptions along critical freight corridors by proactively analyzing bridge inspection reports for unfavorable trends; pay particular attention to corridors without recognized route redundancy	Short-Term
Monitor the MoDOT Tracker to identify system challenges before they impact freight flow	Short-Term
Proactively protect MoDOT assets from potential freight-related incidents; identify potential barriers restricting freight movements, plan work zones, and detours to handle freight vehicles, etc.	Short-Term
Develop minimum design standards for facilities publicly funded on the multimodal Missouri Freight Network	Intermediate
Develop a plan for weigh station maintenance and safety precautions	Intermediate
Continue to work with the railroads to identify opportunities and solve unique rail challenges around the State	Intermediate
Work with the U.S. Army Corps of Engineers (USACE) to dredge slack harbors and replace aging locks and dams on the Mississippi River	Intermediate

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STRATEGY 3:

Cultivate a Long-Term Focus to Develop Comprehensive Freight Corridors

Implementation Tactics	Timeframe
Partner with the private sector to identify and designate future multimodal, oversize, and overweight corridors	Intermediate
Identify and catalog challenges along these key corridors (geometric, bridge, design, and regulatory)	Intermediate
Identify where non-traditional capacity building improvements may significantly reduce congestion (Intelligent Transportation Systems [ITS], managed lanes, value pricing)	Intermediate
Focus on development of north-south and east-west connectivity, including railroad improvements over the Mississippi River	Long-Term

STRATEGY 4:

Take a Solutions-Based Approach to Highway System Capacity Expansion

Implementation Tactics	Timeframe
Partner with the private sector and local governments to identify and implement operational changes to improve freight flow (routing, off-hours delivery, etc.)	Short-Term
Continue to evaluate innovative designs that provide added capacity with limited impacts (diverging diamond interchanges, super-twos, superstreets, etc.)	Short-Term
Continuously evaluate the practical use of innovative solutions to alleviate capacity constraints (dedicated truck lanes, container shuttles, container-on-barge, etc.)	Short-Term
Implement a policy that requires the consideration of cost-effective methods of capacity expansion before building new lane-miles	Intermediate
Examine dedicated facilities for non-freight activity that will serve to restore capacity for freight movement (managed lanes, etc.)	Intermediate
Implement a policy that requires the consideration of available multimodal capacity before building new lane-miles	Long-Term
Study the feasibility of value pricing to fund construction of new lane-miles	Long-Term

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STRATEGY 5: Improve the Availability of Truck Parking

Implementation Tactics	Timeframe
Study the placement and availability of public and private truck parking spaces	Short-Term
Partner with the Highway Patrol to develop an education and enforcement program to reduce prohibited parking where parking facilities are readily available	Intermediate
Use technology to provide real-time parking availability at upcoming public and private facilities	Intermediate
Increase overall truck parking capacity along key corridors (public and private)	Long-Term

STRATEGY 6: Enhance the Resiliency and Maintain Flexibility of the Multimodal Freight System

Implementation Tactics	Timeframe
Plan an annual freight workshop to complete a multimodal system SWOT (strengths, weaknesses, opportunities, and threats) analysis with key statewide stakeholders and partners; this can be done as part of the Freight and Economics Roundtable	Short-Term
Develop a multimodal freight resiliency plan in partnership with the private sector, MPOs, RPCs, homeland security, and safety stakeholders	Intermediate
Review the potential use of time-of-day truck restrictions through major chokepoints	Long-Term
Evaluate, rank, and widen one-lane bridges to increase the safety of rural last-mile trips	Long-Term

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STRATEGY 7: Improve Multimodal Safety and Security

Implementation Tactics	Timeframe
Encourage participation of freight stakeholders in the development of future MoDOT Safety Plans	Short-Term
Ensure that bicycle and pedestrian accommodations are considered in the purpose and need process of future grade separations and railroad crossing improvements	Short-Term
Work with the private sector to strategically locate and develop areas for secure cargo and container storage	Intermediate
Work with legislators and the railroads to maintain and expand the successful MoDOT Highway/Rail Crossing Safety Program	Long-Term

STRATEGY 8: Improve the Health, Safety, and Welfare of Truck Drivers

Implementation Tactics	Timeframe
Transfer lessons learned from this Freight Plan to workforce development officials and efforts	Short-Term
Conduct speed studies along major truck corridors to identify potential speed limit changes	Short-Term
Shift construction activities to overnight when possible	Short-Term
Using the lessons from the 2010 Commercial Vehicle Safety Belt survey, develop an outreach strategy to increase restraint use by truck drivers	Intermediate
Work with MPO partners to improve the physical relationship between interstates and local roads in urban areas	Long-Term

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STRATEGY 9:

Capitalize on the Momentum Created by *Freight On The Move*

Implementation Tactics	Timeframe
Continue conversation with private sector stakeholders by creating a Freight Advisory Council (FAC)	Short-Term
Transition private sector partners into the MoDOT planning process, especially the FAC	Short-Term
Work with regional planning partners to develop regional FACs	Short-Term
Coordinate freight plans and programs of municipalities, counties, MPOs, and RPCs	Short-Term
Develop an outreach program to educate the public on the importance of Missouri's freight system to their daily lives	Short-Term

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STRATEGY 10:

Invest in Freight Infrastructure and Operational Improvements to Drive Long-Term Job Creation

Implementation Tactics	Timeframe
Work with Missouri Department of Economic Development and the Missouri Partnership to enhance connections with the Missouri Certified Sites program (vetted and supported shovel-ready sites designated by the State DED)	Short-Term
Leverage private sector investment to gain political support for investment in non-traditional project types	Short-Term
Explore use of a rail bank to preserve rail corridors for future needs	Short-Term
Evaluate programs like in- lieu fees for their ability to encourage short-line investment	Short-Term
Monitor neighboring states' truck licensing fees to limit leakage from trucks that may register in nearby states with lower fees, but travel mostly in Missouri	Short-Term
Continue to explore the use of private activity bonds to improve multimodal connectivity facilities	Short-Term
Ensure planning and project selection processes consider rural accessibility and just-in-time performance	Intermediate
Streamline and work to reinstate the Rapid Response Cost-Share program	Intermediate
Study the feasibility of alternative funding sources for future needs	Intermediate
Create a statewide programmatic freight selection process and work with districts to supplement district processes	Long-Term
Work with the legislature to study the potential for dedicating additional non-fuel-tax revenue for multimodal investment	Long-Term

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STRATEGY 11: Enhance Missouri's Ability to Export Goods

Implementation Tactics	Timeframe
Work with statewide partners (MDED, local chambers, and modal partners) to develop infrastructure to support and market Missouri as a multimodal hub; North-south and east-west connectivity has the potential to leverage activities such as foreign trade zones	Short-Term
Prioritize investment within infrastructure corridors that are critical to developing Missouri's export market; to support export growth, the State must fully utilize its highway, rail, and inland waterway corridors	Intermediate
Work with economic development officials to develop opportunities that increase inbound trips; to support basic economic growth, the State must increase opportunities for backhaul container availability (empty trains, barges, and trucks that Missouri exports can fill)	Intermediate

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STRATEGY 12:

Expand Interagency Collaboration and Coordination

Implementation Tactics	Timeframe
Continue to support strong relationships between MoDOT districts and local government economic development staff	Short-Term
Continue to work with multijurisdictional and multistate partners to make corridor-wide system decisions, such as dedicated truck lanes	Short-Term
Provide transportation and land use guidance to local and regional agencies to support economic development and freight mobility	Short-Term
Collaborate with economic development partners to support the state DED focus on the Transportation and Logistics industry for business retention and growth	Short-Term
Work with other State agencies to ensure consistency of regulations that impact freight mobility	Intermediate
Work with agency partners to expedite the environmental permitting process while maintaining a focus on mitigating negative impacts	Intermediate

STRATEGY 13:

Use Technology to Improve Freight Movement

Implementation Tactics	Timeframe
Ensure freight stakeholders are involved in the development of future MoDOT Intelligent Transportation Systems (ITS) plans and architecture	Short-Term
Develop a common information protocol to increase the availability of real-time traffic data to assist in routing decisions by logicians and truck drivers	Intermediate
Improve resiliency (advanced ITS, Freight Advanced Traveler Information System, smart routing, etc.)	Intermediate
Expand the Missouri Smart Roadside Program to increase commercial vehicle enforcement throughout the State	Long-Term
Improve and expand ITS technology along key corridors to increase efficiency and reliability	Long-Term

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STRATEGY 14:

Develop Opportunities for Maritime and Air Cargo

Implementation Tactics	Timeframe
Market the availability of the inland waterway system, significant unused capacity, potential mode-shift opportunity	Short-Term
Work with USACE to improve inland waterway resiliency	Short-Term
Work with airport authorities of major air cargo facilities to create multijurisdictional partnerships to coordinate efforts surrounding airports (freight movement and redevelopment strategies); for example, there are several overlapping zoning requirements that hinder redevelopment near Lambert-St. Louis International Airport's air cargo facilities	Short-Term

Project Recommendations

The prioritization process (see Chapter 8) identified a list of priority projects. In addition to the projects in the final prioritized list, some projects that did not progress to the final prioritization process were captured for future consideration. These priority and non-priority projects are discussed below.

Priority Projects

The initial freight project prioritization process generated the prioritized projects list. The initial prioritized list included 76 highway projects, 15 freight rail projects, 3 aviation projects, and 28 port projects. Each of the seven MoDOT districts had projects that ranked either "very high" or "high" priority, demonstrating needs across the State. These projects are listed in Appendix G. Needs and projects identified after the adoption of *Freight On the Move* are appended annually to Appendix G in coordination with the STIP development.

Non-Prioritized Planning Projects

The Freight Plan recommends planning studies for 10 of the approximately 355 non-prioritized projects. These planning efforts would provide in-depth studies to better define transportation needs and improvements. Examples of planning projects are environmental studies, operational analysis, and corridor studies. **Table 9-3** shows the recommended planning projects.

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Table 9-3: Non-Prioritized Planning Projects

District	Type	Route	Project Description	Cost Information (Millions)
KC	Highway	I-35	Improvements from I-35/I-29 split to Rt. 69/33	\$200 - \$225
KC	Highway	US-50	Update the U.S. 50 corridor study. This should require a new interchange at US-50/MO-291 South, a new interchange at US-50/3rd Street and additional capacity of I-470 from US-50 to I-70. (New planning and design standards that employ current approaches to this type of road classification should be sought, especially in light of the exponential growth in Lee's Summit and associated increase in traffic.)	\$5 - \$1
SW	Highway	Joplin West Corridor	New West Corridor in Joplin metro area from MO-171 to I-44	Unknown
CD	Highway	US-63	Construct another Missouri River Bridge in Jefferson City to connect US 63 so traffic doesn't have to go on US-50 through Jeff City	\$55 - \$100
NE	Highway	US-54	Construct shared four-lane roadway from Mexico to Louisiana	\$80 - \$90
SL	Highway	I-44	New interchange at I-44 east of Shrewsbury (South County Connector)	\$45 - \$55
SL	Highway	I-44	Corridor improvements from Shawneetown Ford Rd and Route O, including interchange improvements at US-50	\$25 - \$50
SL	Highway	I-44	Corridor improvements between MO-141 and I-270	\$50 - \$60
SE	Highway	US-61	Construction of a bypass around the northwest side of Jackson is needed, perhaps beginning near County Rd. 335, going northeast and tying back into North High Street (US-61) at Rt. Y, or somewhere north of the Jackson North Industrial Park	\$6 - \$8
SE	Highway	US-63	Construct bypass of West Plains with no stop lights	\$50 - \$60

Gap Analysis Planning Projects

Additional projects identified from the American Transportation Research Institute (ATRI) top 100 Missouri truck bottleneck locations and high commercial vehicle crash rate locations were reviewed and captured for future evaluation. **Table 9-4** lists 12 non-prioritized planning projects for truck bottlenecks or the highest 25 percent of commercial vehicle crash rate locations.

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Table 9-4: Planning Projects for Truck Bottlenecks or the Highest 25 Percent of CMV Crash Rate Locations

District	Type	Route	Project Description	Cost Estimate (Millions)	Bottleneck and/or CMV Crash Rate
NW	Highway	I-29	Interchange improvements at Faraon Rd. in St. Joseph	\$1.5 - \$2.5	CMV
NW	Highway	I-29	Construct an interchange at Cook and I-29 in St. Joseph	\$15 - \$20	CMV
SW	Highway	I-49 loop	Intersection and access improvements on LP49 (Range Line Rd./Madison Ave.) from MO-171 in Webb City to I-44 in Joplin	\$3 - \$4	CMV
SW	Highway	MO-171	Intersection and access improvements on MO-171 (McArthur Drive) from Jefferson St. to Hall St. in Webb City	\$1.5 - \$3	BN
SW	Highway	MO-7 and MO-13	Corridor and safety improvements on MO-7/13 in Clinton.	Unknown	BN
SW	Highway	US-60	Super 2 highway from Monett to Springfield	Unknown	CMV
CD	Highway	US-50	Complete the four-lane of US-50 from west of Linn to Union	\$400 - \$450	CMV
CD	Highway	US-63	Construct four-lane roadway of US-63 from US-50 in Cole County to north of Rolla	\$250 - \$300	CMV
SL	Highway	I-270	Construct additional lanes on I-270 from US-67 to the Missouri River, MO-100 to I-64 and I-44 to MO-30	\$500 - \$700	Partial CMV and BN
SL	Highway	US-50	Add capacity from Progress Parkway to I-44	\$10 - \$15	CMV
SL	Highway	I-270	Corridor and operational improvements to address safety and mobility from McDonnell Blvd to MO-367. Includes adding capacity, improving interchanges, outer roads and access for transit users, bicycles and pedestrians.	\$300 - \$350	BN
SE	Highway	US-63	Upgrade US-63 to 4-lane from Rt. CC in Phelps County to US-60 at Cabool	\$215 - \$220	CMV

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Table 9-5 shows 29 ATRI truck bottlenecks and the highest 25 percent of commercial vehicle crash rate locations where no non-prioritized projects were listed. Each of these locations will require a planning study.

Table 9-5: Truck Bottlenecks and the Highest 25 Percent of CMV Crash Rate Locations with No Projects Identified

District	Route	To	From	Bottleneck Locations	Commercial Vehicle Crash Locations
NW	US-169	I-29	US-36	Yes	
NW	I-29	US-36	I-229		Yes
NW	US-36	I-29	I-229		Yes
KC	I-29	I-435	I-635		Yes
KC	I-435	I-35	I-70		Yes
KC	MO-291	I-35	MO-210		Yes
KC	MO-9	I-35	MO-210	Yes	
KC	Front St	I-29/35	I-435	Yes	
KC	22nd St	I-435	I-70	Yes	
KC	I-35	Kansas state line	I-670	Yes	Yes
KC	I-670	Kansas state line	I-35	Yes	Yes
KC	MO-13	I-70	US-24		Yes
SW	US-65	Marshall	Warsaw		Yes
SW	MO-13	US-54	I-44		Yes
SW	US-60	Kansas state line	I-49		Yes
SW	MO-744	US-65	Glenstone Ave.	Yes	
SW	BU-65	Chestnut Expy	US-60	Yes	
SW	Chestnut Expy	MO-13	US-65	Yes	
CD	US-50	US-54	California		Yes
CD	MO-763	I-70	BU-70	Yes	
NE	None Identified				
SL	Grand Ave	I-70	US-64	Yes	Yes
SL	Kings Highway	I-70	south of I-64	Yes	Yes
SL	MO-115 (Natural Bridge Ave)	Kings Highway	Goodfellow Blvd	Yes	Yes
SL	I-64	RT-K	I-55	Yes	
SL	US-67 (Lindbergh Blvd)	I-70	Illinois state line		Yes
SL	I-270	I-70	US-64		Yes
SL	I-55	I-44	I-270		Yes
SE	BU-67	in Poplar Bluff		Yes	
SE	US-63	US-60	West Plains		Yes

* Route not located on the Missouri Freight Network

** Route owned by local municipality

*** Route not located on the Missouri Freight Network and route owned by local municipality

Chapter 9 – Strategies and Recommendations

Conclusion

Missouri's freight network continues to be the foundation of the state's economic success. Freight supports jobs in targeted freight-dependent businesses such as manufacturing, retail trade, agriculture, and tourism. For the most part, this transportation infrastructure was constructed many years ago. The cost to maintain the system continues to increase and the demands on the system continue to grow. To compete in the 21st century global economy, Missouri must find a way to make the strategic investments in its freight network, as outlined in this chapter, which are necessary to support economic growth and foster the quality of life and place. At the same time, funding to maintain and improve publicly-owned transportation infrastructure is declining to perilous levels.

Chapter 10 – Action Plan and Implementation Strategies

KEY POINTS

- To implement this Freight Plan, people, businesses, organizations, and the State must work together to achieve economic success and improved quality of life. Success will require partnership with communities, economic developers, businesses, and other freight stakeholders willing to tackle real assignments and be responsible and accountable.
- By 2030 freight tonnage is forecast to increase by 37 percent.
- Current funding and financing sources and methods are not providing the resources we need to maintain, much less grow our freight transportation infrastructure to meet the needs of today and tomorrow.

The Missouri State Freight Network is the backbone of the State's economy, supporting the movement of goods and commodities, facilitating the retention and creation of jobs and setting the conditions for private investment, and enhancing the quality of life for Missourians. By 2030, total projected freight tonnage along Missouri's freight system is estimated to increase 37 percent. There is a need for capacity and maintenance improvements to relieve congestion and maintain the reliability of the network. Maintenance of the multimodal freight infrastructure is critical to the State's economy and high priority improvements to the freight network will facilitate the movement of people and goods throughout the state to ensure businesses, which compete in an increasingly global marketplace, can promise just-in-time deliveries to customers around the world and can reliably deliver on that promise.

Future decisions regarding maintenance, safety, connectivity and mobility, and economic growth and competitiveness of the freight network present real challenges, the greatest of which is the availability of funding for freight infrastructure and facilities. A successful approach for implementing this Missouri

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State Freight Plan considers the challenges and opportunities to maintain and expand the system to meet current demands as well as the needs of tomorrow.

Freight Strategic Action Plan

A freight action plan implements the strategies and recommendations identified in this Freight Plan and adopts a new decision-making process to create the freight transportation system prepared for the future.

Prioritized Freight Projects

The freight project prioritization process involved stakeholders from across the State adding to the significant public outreach efforts from the Missouri *On the Move* initiative. Over 3,800 projects were initially reviewed and through a tiered evaluation process (outlined in Chapter 8), those projects were narrowed to a prioritized list of 122 projects (Appendix G). These projects represent all freight modes and each of the MoDOT Districts. This is a testament to the freight needs statewide and the recognition of the critical linkages between economic development and freight.

The next step in this process is to identify which projects will be moved forward first and then addressing planning and environmental studies that may be needed before the projects can be included in the Missouri State Transportation Improvement Program (STIP). The very high priority projects should be evaluated to identify steps required to move these projects through the planning phase to the programmed phase. As part of this process, the Freight Advisory Committee and stakeholders will provide input on which freight projects to move forward.

Current and Future Funding

Funding is critical to implementation. The estimated cost of the freight projects ranked “very high” in the prioritization process exceeded \$5 billion. These projects include improvements to a rail terminal in Springfield, capacity improvements to I-70 in St. Louis, improvement to I-35 and I-670 in downtown Kansas City, and a rail to port connection for the New Bourbon Port. Every project is important to freight movement and economic development. Securing the funding to maintain the freight network, address safety concerns, improve connectivity and mobility of the freight system, and support economic growth and competitiveness for Missouri requires financial resources well beyond those currently available. Additional federal resources, increased State investment, and other financing strategies will be needed to close the gap between the freight infrastructure and facility needs and the supply of funds.

The shortage of funds is a critical problem. The Missouri Department of Transportation (MoDOT) should review the list of priority projects with its partner organizations, agencies, and freight stakeholders to identify funding for these projects. Initial funding for planning and preliminary engineering should be identified so that strategic projects can be positioned and ready for development if funding is identified. The lack of funding available today need not stop progress in its tracks, but it represents the most significant obstacle to the implementation of the Freight Plan.

Chapter 10 – Action Plan and Implementation Strategies

Freight and Economic Development

Much of Missouri's economy is dependent upon freight and goods movement. Over 52 percent of Missouri's Gross Domestic Product (GDP) in 2013 was generated by industries that are directly dependent on transportation and 89 percent of Missouri's exports were manufactured goods. Nevertheless, many of the State's residents don't recognize the role that freight plays in their daily lives—at their jobs, on the dinner table, and in the quality of life they enjoy each day. The implementation of the State Freight Plan is an opportunity to continue to engage freight stakeholders, economic development partners, and the business community. It also is useful to educate elected officials and policy leaders in the State so they have a better understanding of why freight matters to Missouri. This freight plan should be the framework for future freight planning initiatives and education and communication strategies. Specific actions designed to expand the understanding of freight's role in the State's economy, address issues of concern related to freight, and strengthen relationships with freight stakeholders and partners is included later in this chapter as well as in Chapter 7.

Policy Issues, Trends, and Challenges in Missouri

Stakeholder outreach activities and research conducted as part of the development of this plan identified a number of policy issues. Future scenarios were used to guide additional policy recommendations that support the Freight Plan goals. Trends and issues including freight growth by mode were projected out until 2030, and emerging trends for the growth or decline of key industries and other significant conditions influencing Missouri goods movement were addressed. This information is presented in Chapters 5 and 9.

The future economic prosperity of Missouri will be built on existing strengths and on new policies, programs, and opportunities that MoDOT will pursue in a targeted and focused manner. Chapter 7 outlines these policies. To implement this Freight Plan, people, businesses, organizations, and the State must work together to achieve economic success and improved quality of life. Success will require partnership with communities, economic developers, businesses, and other freight stakeholders willing to tackle real assignments and be responsible and accountable. Additional guidance on interagency coordination and external partnerships can be found in this chapter.

Engaging Partners and Stakeholders

MoDOT has a long history of building partnerships to drive the development of the State's transportation system. Today, that grassroots engagement encourages Missourians to share their ideas about transportation and brings stakeholders together for meaningful discussions about challenges and opportunities. The State's future success as a freight leader will continue to build on these partnerships by engaging modal partners, organizational partners, Metropolitan Planning Organizations (MPOs) and Regional Planning Commissions (RPCs), economic development organizations, other State agencies, professional organizations, and multi-jurisdictional partners in an ongoing discussion about freight needs, issues, and opportunities.

Interagency coordination and external partnerships must be united with a common vision and goals to effectively advance the actions and recommendations identified in the freight plan. MoDOT should also

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continue to expand its relationship with external stakeholders through the continuation of regional freight forums, presentations at economic development conferences, and participation in business roundtables in the State. MoDOT should continue to participate in multi-jurisdictional partnerships that support Missouri's multimodal freight network and associations. Multi-jurisdictional partners include the Mid-America Freight Coalition, Institute for Trade and Transportation Studies, the Mid-America Intermodal Authority Port, and related American Association of State Highway and Transportation Officials (AASHTO) committees.

Ongoing Freight Planning

Ongoing freight planning is important. The freight system must continue to meet the transportation needs of a rapidly changing economic environment, integrating each of the freight modes with connections to a growing array of origins and destinations. Updates to this State Freight Plan should be undertaken regularly on a three- to five-year cycle to ensure the plan reflects the most current conditions and the evolving needs for freight services within the State.

The State Freight Plan has identified additional planning activities for the future:

- Build upon the analysis and the identified State Freight network in Chapter 3 by identify first and last mile gaps in the freight network near major manufacturing hubs and multimodal connectivity points
- Develop minimum design standards for freight facilities publically funded on the multimodal freight network; encourage compliance with these standards for all freight facilities regardless of funding source
- Undertake a public-private partnership plan to identify future multimodal, oversize and overweight corridors; evaluate their condition; determine necessary improvements; and designate the future network in advance
- Work with the private sector to evaluate north-south and east-west connections across the Mississippi River for highway and freight rail
- Develop a guide book incorporating freight-supportive design standards, freight-supportive land use, operational improvements such as delivery requirements, designation of truck routes, and other strategies that can help to improve the movement of freight; careful consideration should be given to the impacts of these standards on freight operators, and review by the Freight Advisory Committee could provide valuable input to ensure the standards can benefit both freight and communities
- Prepare a statewide study of available truck parking areas, the need for future truck parking locations, and guidance for the placement of future truck park facilities
- Conduct a study to determine the potential benefits and challenges of developing a rail bank or similar entity to preserve future rail corridors or retain rail corridors that may be abandoned by railroads in the future
- Analyze Missouri's inventory of industrial land with proximity to existing ports and freight rail lines and facilities as preservation of industrial land resources with multimodal transportation access is crucial to key industries

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- Develop a model “Freight and Industrial Facilities Planning Guide” incorporating good neighbor guidelines to assist planning organization, municipalities, developers, elected officials, and others in identifying tools and strategies that can be valuable to the development of quality freight and industrial facilities
- Promote the use of clean green smart technologies with freight operators throughout the State; create a Green Goods Movement award program to recognize freight operators who effectively implement these technologies

Interagency Coordination and External Partnerships

Implementation of the freight plan should build on the interest and momentum created through the freight planning process. Ongoing communication will help develop projects and implement policies as well as efforts to secure needed funding. By formalizing a Freight Advisory Committee (FAC), freight needs and issues can be discussed regularly and a coordinated and consistent message about the importance of freight can be shared. The FAC will be comprised of private stakeholders representing industries, freight transportation modes, all geographical regions, and various government agencies (state, local and MPOs). The FAC represents economic, transportation, industry, agricultural and safety interests working together to find opportunities to improve freight movement in Missouri to enhance the state’s economy and quality of life.

Formalizing the FAC provides an important vehicle for continuing discussions with representatives from the public and private sector about freight policy, programs, and future resources. This committee can provide meaningful insights and ongoing evaluation of markets, infrastructure conditions, and economic development impacts. Bringing together executive-level representatives from freight industry leaders on a quarterly basis provides a valuable platform for the discussion of freight network conditions, available resources, new financing options, and evaluation of proposed policy changes.

Although comprised of a diverse group of stakeholders—Class I and short line rail carriers, port authorities, major shippers, trucking and logistics companies, intermodal terminal operators, and public sector freight representatives from MoDOT, Federal Railroad Administration (FRA), Federal Aviation Administration (FAA), Federal Highway Administration (FHWA), Federal Maritime Administration (MARAD), Missouri Department of Economic Development, Missouri Department of Agriculture (MDA), and major economic development organizations—the committee shares a goal to improve freight mobility and connectivity, safe operations, increased economic development, and funding availability.

Coordinating the freight plans and programs of the cities, counties, MPOs, RPCs and regional economic development organizations is important to the successful implementation of the Missouri State Freight Plan.

Regional Freight Councils can engage MPOs, RPCs, bi-state development agencies, and regional economic and planning organizations such as KC Smart Port, Mid-America Regional Council, the East-West Gateway Council of Governments, University Transportation Centers, and other organizations. These councils should be important partners for ongoing freight planning, development of outreach

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freight education programs, and monitoring the conditions of freight facilities and infrastructure.

Funding Assessment and Financing Strategies

The State of Missouri is very familiar with the traditional federal resources available to support freight transportation services including US DOT, FHWA, MARAD, FAA, FRA, discretionary TIGER Grant funding, as well as federal financing tools such as Grant Anticipation Revenue Vehicle (GARVEE) Bonds. Beyond those traditional transportation programs, several other federal programs could provide funding for certain freight infrastructure projects through agencies including the Department of Commerce Economic Development Administration (EDA), Department of Homeland Security, Department of Agriculture Rural Community Facility Programs, and Department of Housing and Urban Development (HUD). The State should consider an evaluation of non-traditional funding and financing strategies that could be used to advance the priority projects identified in the freight plan.

The National Disaster Resilience Competition was recently announced providing almost \$1 billion in funding from HUD Community Development Block Grants and Resiliency Disaster Recovery (CDBG-RDC) funds. Funding may be used for infrastructure projects, and the State of Missouri is an eligible applicant. With continued funding for TIGER grants, consideration should be given to high priority freight projects that could effectively compete in this funding process.

Innovative State Funding and Financing Programs

Many state DOT's are evaluating new financing strategies for transportation, including mileage-based user fees. Currently, Missouri does not have legislative authority to pursue Public-Private Partnership (P3) projects. While there are a number of financing programs, including GARVEE Bonds, that allow states to borrow against future government funding, these funds do not expand the available financial resources to support transportation infrastructure and facilities but can be an effective tool to fund critical near term improvements.

Many states have developed programs offering grants or low/no interest loans to facilitate needed improvements to freight infrastructure and facilities. Missouri has a program to assist airports. Dedicated funding for freight rail, ports, or intermodal facilities are provided by a number of states including Ohio, Florida, Virginia, Tennessee, Washington, and Texas.

Public-Private Partnerships (P3s)

Public-private partnerships engage the private sector to fund and often operate and maintain infrastructure assets. The partnerships are contractual agreements between a public entity and the private sector that allows the private sector to participate in the delivery of transportation projects for an agreed upon return. Missouri has not enacted legislation for P3s, but it is an active topic.

Thirty-three states have enacted enabling legislation allowing the use of various P3s to fund transportation projects, and eight states have actually initiated P3 projects. Texas used a P3 approach to develop the Trans Texas Corridor, a statewide transportation network including roads, commuter and freight rail, and utility infrastructure. The State of Virginia has used a P3 for the Dulles Rail Corridor,

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high occupancy toll lanes, and the reconstruction of toll truck lanes.

There are a number of different P3 models:

- Build-transfer is similar to a design-build project in which the public sector contracts with a private partner to design and build a facility according to a set of requirements developed by the public entity. When the project is completed, the public agency becomes responsible for operating and maintaining the facility. The advantage of this approach is the speed of completion and efficiencies realized by private sector project management.
- Under the design-build-finance-operate model the private sector designs, builds, finances, and operates and/or maintains the infrastructure under a long-term lease. At the end of the lease term, the facility is transferred to public ownership.

P3s will not replace traditional transportation infrastructure financing, but it is one tool that can help address critical infrastructure needs. The process requires careful analysis of the most appropriate structure, risk allocation, and other important objectives. Public-private partnership provides a new source of funding for infrastructure projects, and other benefits often are realized, as well, including better construction completion, shifted construction and maintenance risk to private partners, cost savings, accelerated infrastructure construction, and a process that allows the public sector to focus on outcomes rather than inputs and process.

Missouri should evaluate the various public-private partnership models including more innovative hybrid models that have been used recently. Public-private partnership can provide significant benefits, but it also generates challenges. Because the use of public-private partnership has expanded in recent years, there are valuable lessons to be learned from other state governments. Public-private partnerships can enable critical transportation projects to move forward even in this constrained financial environment.

Rail Loan Assistance Programs

A number of states provide no-interest or very low interest loans - most are exclusive to short line railroads - to preserve railroad infrastructure through track maintenance and rail rehabilitation projects. These loans have a specific repayment period. Project eligibility is frequently tied to fixed asset improvements and structures such as bridges and culverts, rather than to mobile assets like trains. As an example, the Michigan Rail Loan Assistance Program provides a maximum of \$1 million per project and will cover 90 percent of eligible projects through the loan. Minnesota, Ohio, Oregon, and Virginia have similar programs. Ohio's Rail Line Acquisition Program provides loans to acquire and preserve rail right-of-way for future rail use.

Connect Oregon is a lottery funded initiative that Oregon DOT utilizes to provide grants and low-interest loans to public and private entities to invest in non-highway transportation projects to enhance multimodal transportation and promote economic development in the state. A selection process is approved by the Oregon Transportation Commission and this selection process is subsequently used to evaluate project applications. The program, started in 2005 has awarded \$140 million in state funds (2005 – 2014) resulting in direct investment of \$834 million in leveraged funding from other non-state

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public and private sources. These projects have helped to create new jobs, retain major employers, remove barriers to economic development in rural and urban areas, and support other strategic multimodal economic development investments in the State for rail, aviation, marine, and transit infrastructure.

Conclusion

If we continue to do things the way we have always done, we'll get the same results. Unfortunately, the results and resources we are getting today are insufficient to support freight mobility in Missouri and throughout our nation. Change is necessary. Current funding and financing sources and methods are not providing the resources we need to maintain, much less grow our freight transportation infrastructure to meet the needs of today and tomorrow.

Missouri has been a victim of its success. It has maintained the freight transportation system very well with shrinking funds. As such we take it for granted that tomorrow will be the same. The legacy funding and financing programs have run their course and no longer yield the resources required for today's freight mobility needs. Different funding means, which fairly assess users and are directed to freight projects, are needed. Stakeholders and system users have a voice in the process. Inclusion of the private sector in the decision-making process will greatly assist the public sector in making the right investment decisions. This in turn will set the conditions for Missouri's economic development.

Appendix A-

ASSETS AND

FREIGHT FLOW

TECHNICAL MEMO

Assets and Freight Flow

This technical memorandum provides an inventory of the existing freight assets and freight flows. The inventory includes all modes of freight transportation; highway, rail, air, water, and pipeline. It also includes an inventory of intermodal facilities where the different modes interact to exchange freight and the freight generators located within Missouri. For each of the modes of transportation a discussion of freight flows and forecasts is provided.

Introduction

Freight movement provides many economic benefits to the State through the shipment of parts to support production done in Missouri by Missouri workers, as well as, through the shipment of finished products moved both into and out of the State. The economic vitality of the State relies on transportation of goods into, out of, within, and to a lesser extent through Missouri to support jobs and growth throughout the State.

The production and transporting goods are key elements to the economic vitality of Missouri. The top ten occupations in Missouri for 2012 are shown in **Table A-1**. Two key occupations (Production and Transportation) are listed for 2012. Production is at number four with 188,170 employees and Transportation at number six with 176,490 employees.

Table A-1: 2012 Top Ten Occupations in Missouri

Top Ten Occupations in Missouri (2012)	
Occupation	Employees
Office and Administrative Support	434,790
Sales	264,150
Food Preparation	244,770
Production	188,170
Healthcare	179,390
Transportation	176,490
Education	150,510

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Management	131,960
Financial	121,220
Installation and Maintenance	103,200

Source: U.S. Bureau of Labor Statistics

Appendix A: Assets and Freight Flow Technical Memo

As Missouri's population grows the demands for goods will follow, requiring more goods to be transported into or within the State. According to Woods and Poole Economic data in **Table A-2**, Missouri is expected to have an annual growth rate of 0.62 percent from 2012 to 2040. This results in over a million additional Missourians by 2040. The ten fastest growing counties by annual growth rate are shown in **Table A-2**.

Table A-2: Top 10 Fastest Growing Missouri Counties

Top 10 Fastest Growing Missouri Counties			
County	2012 Population	2040 Population	Annual Growth Rate
Christian	79,824	143,530	2.12%
Platte	92,054	163,260	2.07%
Cass	100,376	171,910	1.97%
Clay	227,577	358,420	1.64%
Boone	168,535	263,150	1.60%
Lincoln	53,354	79,870	1.45%
Newton	59,069	86,110	1.36%
Taney	52,956	76,300	1.31%
Greene	280,626	397,020	1.25%
St. Charles	368,666	517,450	1.22%

Source: Woods and Poole Economics

Missouri follows national trends of population growth in and around urban counties with less growth or negative growth in rural counties. By 2040, Missouri population is estimated to be over 7 million people. **Table A-3** shows the most populous counties are expected to include:

Table A-3: Highest Projected 2040 Population by County

Highest Projected 2040 Population by County			
County	2012 Population	2040 Population	Annual Growth Rate
St. Louis	1,000,438	1,050,850	0.18%
Jackson	677,377	682,610	0.03%
St. Charles	368,666	517,450	1.22%
Greene	280,626	397,020	1.25%
Clay	227,577	358,420	1.64%
Jefferson	220,209	295,380	1.05%
Boone	168,535	263,150	1.60%
St. Louis City	318,172	246,080	-0.91%
Cass	100,376	171,910	1.97%
Platte	92,054	163,260	2.07%

Source: Woods and Poole Economics

Appendix A: Assets and Freight Flow Technical Memo

Freight System Assets

This section provides an inventory of Missouri's major freight system assets for each mode of freight transportation, including highway, rail, air, water, and pipeline. In addition to the inventory for each mode, an inventory of intermodal facilities and freight generators is also provided.

Highway

Missouri has the seventh largest state highway system in the United States (U.S.). It is made up of 33,700 miles of roadway, 5,500 miles of which are classified as heavily traveled "major highways" and 28,200 miles of which are defined as lesser traveled "minor highways."¹ Missouri's major highways encompass just 20 percent of the state highway miles but carry 80 percent of the system's traffic. **Table A-4** lists the miles of Missouri's heavily traveled "major highways" by functional classification.

Table A-4: Miles of Missouri's Major Highways by Functional Classification

Miles of Missouri's Major Highways by Functional Classification

Functional Classification	Centerline Miles
Freeway	1,357
Interstate	1,385
Local	0
Major Collector	5
Minor Arterial	36
Principal Arterial	2,736
Total	5,519

Source: A Vision for Missouri's Transportation Future, MoDOT, 2014

National Highway System

The National Highway System (NHS) comprises approximately 160,000 miles of roadways important to the nation's economy, defense, and mobility.² The NHS was developed by the U.S. Department of Transportation in cooperation with states, municipalities, and metropolitan planning organizations (MPOs). The NHS includes the Interstate Highway System and the Strategic Highway Network (STRAHNET). The STRAHNET is a system of public highways that provides access, continuity, and emergency capabilities for military personnel and equipment. Other principal arterials and connector routes are also part of the NHS. In all, the NHS includes:

- Interstates
- Other principal arterials in rural and urban areas which support the interstate system by providing access to and from freight generators, major port, airport, public transportation facility, or other intermodal transportation facility

¹ A Vision for Missouri's Transportation Future, MoDOT, 2014

² FHWA.com

Appendix A: Assets and Freight Flow Technical Memo

- The STRAHNET is a network of highways which have been identified as important for U.S. strategic defense policy
- Major strategic highway connectors which provide access between major military installations and the STRAHNET
- NHS designated intermodal connectors which provide access between major intermodal facilities and the NHS.

Figure A-1 shows the nearly 5,900 miles of NHS facilities in Missouri.

Interstate Highways

There are 18 Interstate Highways within Missouri, including nine main routes and nine auxiliary routes. These are listed in **Table A-5** and shown in **Figure A-1**. Interstate main routes are one or two digit numbered routes, while the auxiliary routes are three digit circumferential routes serving urban areas. The central location of Missouri benefits the transportation of freight as the interstate system located in Missouri provides national access to a vast majority of the nation. **Figure A-2** shows the national extent of the Interstates in Missouri.

Interstate 29

I-29 is located within four States including Missouri, Iowa, South Dakota, and North Dakota. It is approximately 557 miles in length running from I-35/I-70 in Kansas City, Missouri to the Canadian border near Pembina, North Dakota, where it becomes Manitoba Highway 29 and connects to Winnipeg, Manitoba. I-29 connects to five major Interstates: I-70, I-35, I-80, I-90, and I-94.

Within Missouri, I-29 runs approximately 125 miles from its southern terminus at I-35/I-70 to the Iowa border. I-29 serves the metropolitan areas of Kansas City and St. Joseph.

Interstate 35

I-35 stretches from Laredo, Texas to Duluth, Minnesota, traversing a distance of roughly 1,570 miles. I-35 connects six states including Missouri. It is one of the most important freight corridors in the U.S. and provides access to North American Free Trade Agreement (NAFTA)-related international transborder freight at the Laredo, Texas port of entry. I-35 connects to 12 major Interstates: I-10, I-37, I-20, I-45, I-30, I-40, I-44, I-29, I-70, I-80, I-90, and I-94.

I-35 has a length of approximately 114 miles through Missouri, from the Kansas border at its southern terminus in Kansas City, Missouri to the Iowa border. Within Missouri, I-35 intersects I-670, I-70 and I-29. I-35 serves the metropolitan areas of Kansas City.

Interstate 44

I-44 is located within three states including Texas, Oklahoma and Missouri. It is approximately 633 miles in length running from Wichita Falls, Texas to St. Louis, Missouri. I-44 connects to five major Interstates: I-40, I-35, I-49, I-55, and I-70.

Within Missouri, I-44 runs approximately 290 miles from its southern terminus at the Oklahoma border to its eastern terminus at the Illinois border. I-44 serves the metropolitan areas of Joplin, Springfield, and St. Louis.

Appendix A: Assets and Freight Flow Technical Memo

Interstate 49

I-49 is a Federal Highway Administration (FHWA)-designated High Priority Corridor and is currently located within two States, Louisiana and Missouri. Between Louisiana and Missouri, it runs through Arkansas, but is not designated as an interstate in Arkansas. Approximately 208 miles currently exists between Lafayette, Louisiana and Shreveport, Louisiana.

Within Missouri, I-49 runs approximately 180 miles from its southern terminus north of the Arkansas border to its northern terminus in Kansas City, Missouri. I-49 serves the Joplin and Kansas City metropolitan areas. Missouri's remaining section is the connection to the Bella Vista bypass.

Interstate 55

I-55 extends approximately 964 miles from I-12 in New Orleans, Louisiana to Chicago, Illinois. I-55 serves six states including Louisiana, Mississippi, Arkansas, Tennessee, Missouri, and Illinois. I-55 connects to 14 major Interstates: I-10, I-12, I-20, I-40, I-57, I-44, I-64, I-70, I-72, I-74, I-80, I-39, and I-90/94.

Within Missouri, I-55 runs approximately 210 miles from its southern terminus at the Arkansas border south of Sikeston to St. Louis. I-55 is the easternmost Interstate in Missouri. I-55 parallels the Mississippi River and serves Sikeston, Cape Girardeau, and the St. Louis metropolitan area.

Interstate 57

I-57 terminates at I-55 near Sikeston, Missouri. It runs approximately 386 miles from I-55 in Missouri to its northern terminus in Chicago, Illinois. I-57 connects to seven major Interstates: I-24, I-64, I-70, I-72, I-74, I-80, and I-94.

Within Missouri, I-57 runs approximately 22 miles from I-55 to the Illinois border. I-57 serves Sikeston.

Interstate 64

I-64 extends approximately 903 miles from Portsmouth, Virginia to I-70 at Wentzville, Missouri. I-64 serves six states including Virginia, West Virginia, Kentucky, Indiana, Illinois, and Missouri. I-64 connects to 12 major interstates: I-95, I-81, I-77, I-79, I-75, I-71, I-65, I-69, I-57, I-44, and I-70.

Within Missouri, I-64 runs approximately 40 miles from the Illinois border to its western terminus at I-70 in Wentzville. I-64 serves the St. Louis metropolitan area.

Appendix A: Assets and Freight Flow Technical Memo

Interstate 70

I-70 extends approximately 2,153 miles from near Baltimore, Maryland to Cove Fort, Utah. I-70 serves 10 States including Utah, Colorado, Kansas, Missouri, Illinois, Indiana, Ohio, West Virginia, Pennsylvania, and Maryland. I-70 connects to 20 major Interstates: I-68, I-81, I-99, I-79, I-76, I-77, I-71, I-75, I-74, I-69, I-65, I-57, I-55, I-64, I-44, I-35, I-29, I-25, I-76 and I-15.

Within Missouri, I-70 runs approximately 251 miles from the Illinois border in St. Louis to the Kansas border in Kansas City. I-70 connects the two largest metropolitan areas in Missouri, St. Louis and Kansas City. In addition, I-70 serves the Columbia metropolitan area.

Interstate 72

I-72 terminates at US-61 in Hannibal, Missouri. It runs approximately 180 miles from Hannibal, Missouri to its eastern terminus in Champaign-Urbana, Illinois. I-72 connects to two major Interstates: I-55 and I-57.

Within Missouri, I-72 runs approximately two miles from US-61 to the Illinois border. As part of a High Priority Corridor, it is possible that US-36 could be converted to interstate standards which would extend I-72 across Missouri to St. Joseph.

Interstate 155

I-155 is a freeway connection between I-55 near Caruthersville and I-69 in western Tennessee. It is approximately 11 miles in length.

Interstate 170

I-170 is the inner freeway connection between I-270 and I-64 in St. Louis and is approximately 11 miles in length.

Interstate 229

I-229 is the freeway loop serving St. Joseph and is approximately 15 miles in length. It connects to I-29 at both the northern and southern termini.

Interstate 255

I-255 is a partial freeway loop around St. Louis and is approximately four miles in length. It provides connections to I-55 and I-70 in Illinois.

Interstate 270

I-270 is a partial freeway loop around St. Louis. It runs approximately 36 miles from I-55, looping around the west and north sides of the St. Louis metropolitan area and enters Illinois.

Interstate 435

I-435 is a full freeway loop around Kansas City. It runs 56 miles in Missouri from the Kansas border/Missouri River north to I-29, travels generally east, turns south and turns back to the west and leaves Missouri at the Kansas border in the southern portion of the Kansas City metropolitan area.

Interstate 470

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I-470 is a partial freeway loop in the Kansas City metropolitan area. It runs 17 miles from I-70 to I-435 in the southeast portion of Kansas City metropolitan area.

Interstate 635

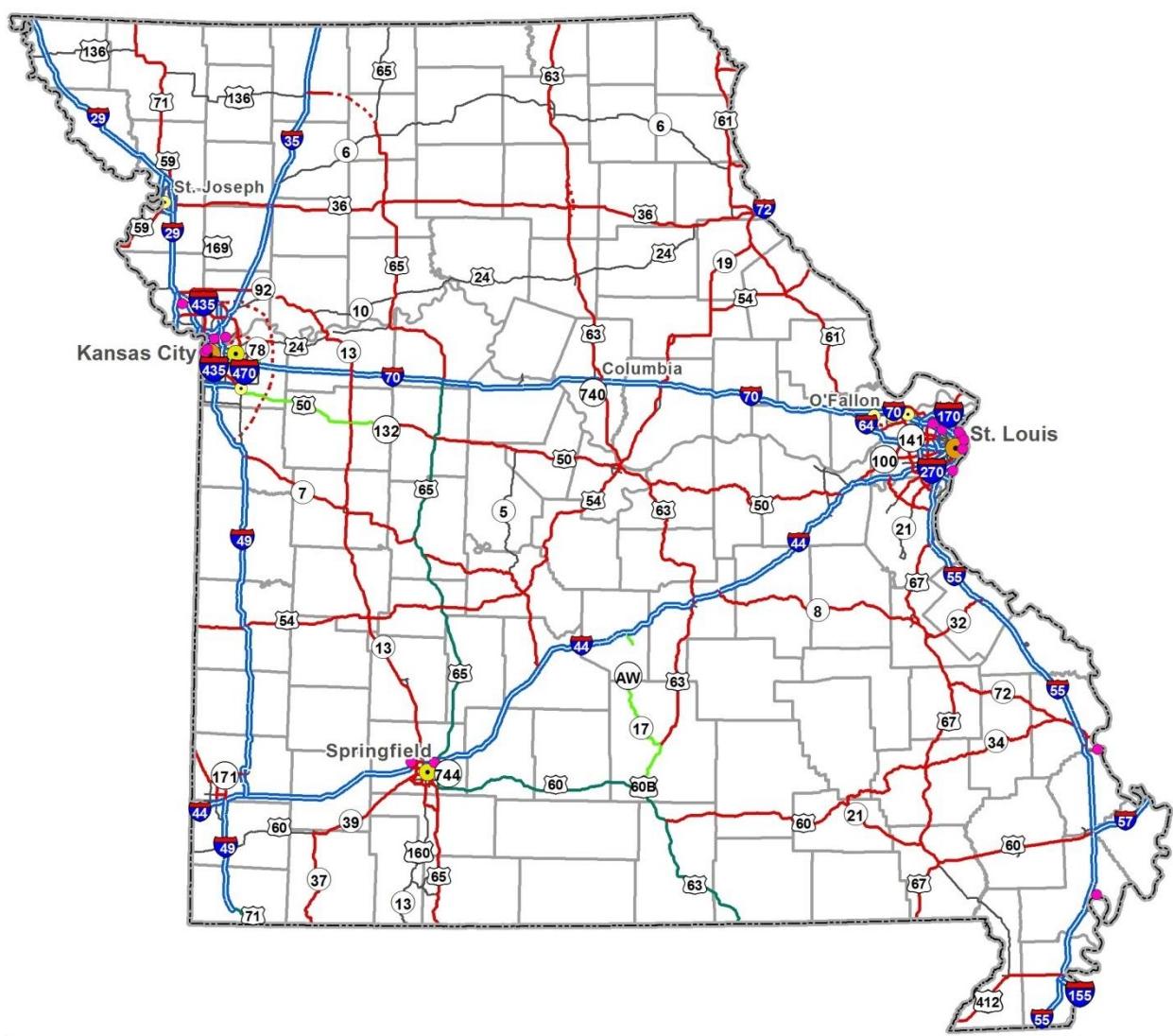
I-635 is a freeway connector in the Kansas City area. It runs 13 miles from I-35 in Kansas to I-29 on the north. In Missouri, it runs approximately four miles between the Kansas border and I-29.

Interstate 670

I-670 is a freeway connector skirting the Kansas City, Missouri downtown area. It runs three miles from I-70 near the Kansas City downtown loop and reconnects to I-70 in Kansas. Approximately one mile of I-670 is in Missouri and connects to I-35.

Appendix A: Assets and Freight Flow Technical Memo

Figure A-1: Missouri National Highway System



Legend

- USA Major Cities (1:500k-1m)

 - FHWA Intermodal Facilities
 - 1,000,000 and greater
 - 500,000 - 999,999
 - 250,000 - 499,999
 - 100,000 - 249,999
 - 50,000 - 99,999
 - Eisenhower Interstate System
 - Other NHS Routes
 - Non-Interstate STRAHNET Route
 - Major STRAHNET Connector
 - Intermodal Connector
 - Intermodal/STRAHNET Connector
 - Unbuilt NHS Routes
 - MAP-21 Principal Arterials

Data Sources: USDOT FHWA, MoDOT, and ESRI

Appendix A: Assets and Freight Flow Technical Memo

Table A-5: Total Miles, Overlap Miles, and Major Cities Served by Missouri Interstate Highways



Legend

Designated Truck Route

- Federal Truck Route, Interstate Route
- Federal Truck Route, US Route
- State Truck Route, US Route
- Federal Truck Route, State Route
- State Truck Route, State Route

USA Major Cities (1:500k-1m)

- 1,000,000 and greater
- 500,000 - 999,999
- 250,000 - 499,999
- 100,000 - 249,999
- 50,000 - 99,999

Data Sources: MoDOT and ESRI

Appendix A: Assets and Freight Flow Technical Memo

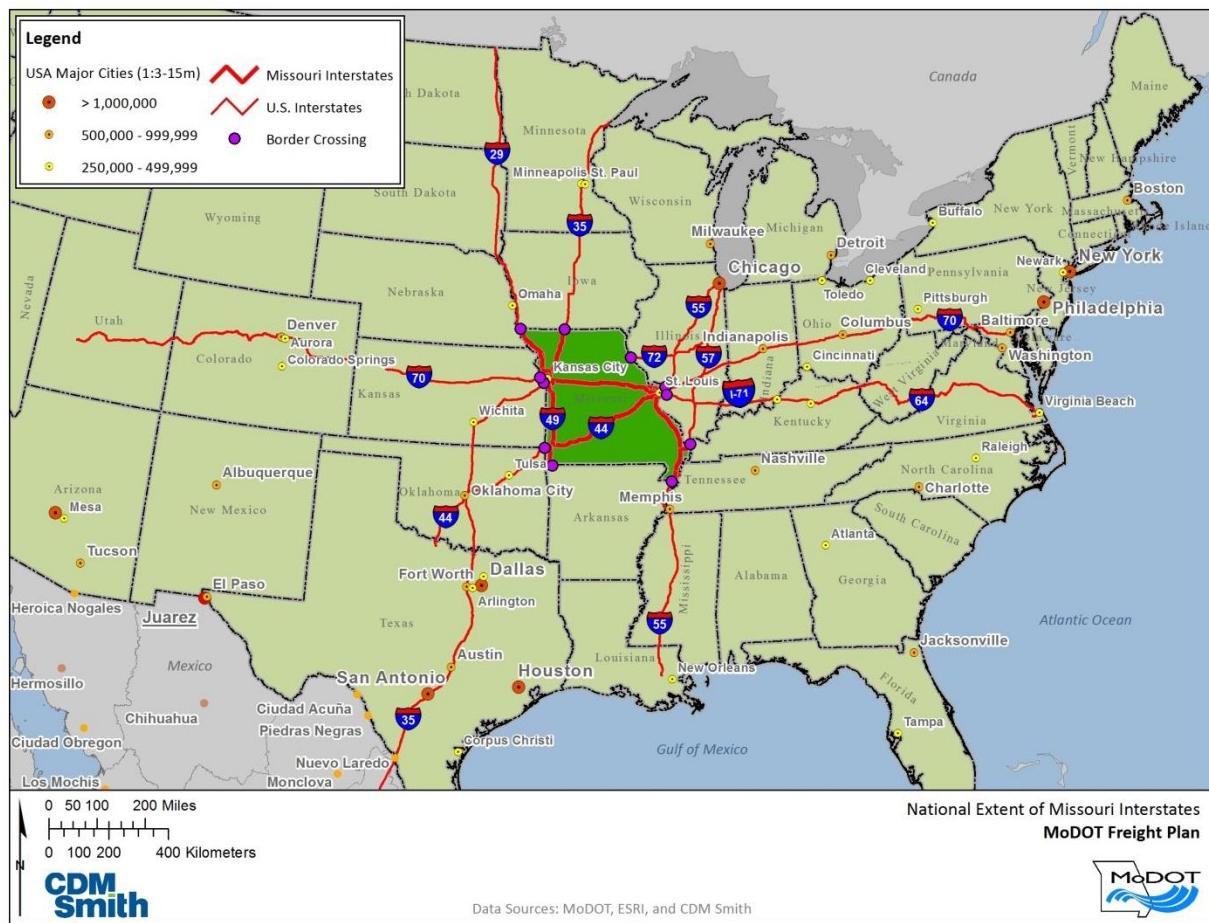
Missouri Interstate Highways

	Interstate Route	Total Miles	Overlap Miles	Route	Major Cities Served (population larger than 5,000)
Main Routes	I-29	125.22	5.5	I-35	Gladstone, St. Joseph, Kansas City
	I-35	113.74	1.0	I-70	Kansas City, Liberty
	I-44	290.49	-	-	Crestwood, Eureka, Kirkwood, Lebanon, Marshfield, Rolla, Shrewsbury, Springfield, St. Louis, Sunset Hills, Webster Groves, Wildwood
	I-49	178.96	-	-	Joplin, Kansas City
	I-55	209.45	1.0	I-44	Affton, Arnold, Barnhart, Cape Girardeau, East St. Louis, Festus, Lemay, Mehlville, Perryville, Sikeston
	I-57	21.96	-	-	Sikeston
	I-64	40.50	-	-	Brentwood, Chesterfield, Ladue, Lake St. Louis, O'Fallon, Richmond Heights, St. Louis, Town and Country, Wentzville
	I-70	251.66	-	-	Berkeley, Blue Springs, Boonville, Bridgeton, Columbia, Independence, Kansas City, Lake St. Louis, Maryland Heights, O'Fallon, St. Ann, St. Charles, St. Louis, St. Peters, Wentzville
	I-72	2.04	-	-	Hannibal
	I-155	10.84	-	-	Caruthersville
Auxiliary Routes	I-170	11.17	-	-	St. Louis, Hazelwood, Berkeley, Clayton, University City, Richmond Heights
	I-229	14.97	-	-	St. Joseph
	I-255	3.77	-	-	St. Louis
	I-270	35.62	-	-	St. Louis, Florissant, Ferguson, Bridgeton, Kirkwood
	I-435	52.78	-	-	Kansas City, Grandview, Raytown, Independence, Gladstone
	I-470	16.72	-	-	Kansas City, Lee's Summit, Independence
	I-635	3.77	-	-	Kansas City
	I-670	1.17	-	-	Kansas City
TOTAL		18	1384.83	7.5	
Routes					

Sources: <http://www.fhwa.dot.gov/reports/routefinder/table1.cfm>, <http://www.fhwa.dot.gov/reports/routefinder/table2.cfm>,
<http://www.fhwa.dot.gov/reports/routefinder/table3.cfm>

Appendix A: Assets and Freight Flow Technical Memo

Figure A-2: National Extent of Missouri Interstates



NHS Intermodal Connectors

"Intermodal connectors" are roadways that tie together the intermodal freight facilities to the national transportation system. Connectors link major freight activity nodes to arterial highway systems and improve the ability of networks to serve ports, rail yards, airports, and other freight intensive nodes efficiently. When designed, maintained, and operated with freight in mind, connector routes facilitate the best use of individual modes and improve the overall efficiency of regional highway networks. Designated NHS connectors are often referred to as the first and last miles of roadway used by truckers to travel between the major highways of the NHS and the nation's ports, rail terminals, and air cargo hubs. A listing of Missouri's currently designated NHS Intermodal Freight Connectors is included in Attachment A.

Missouri Major Highways

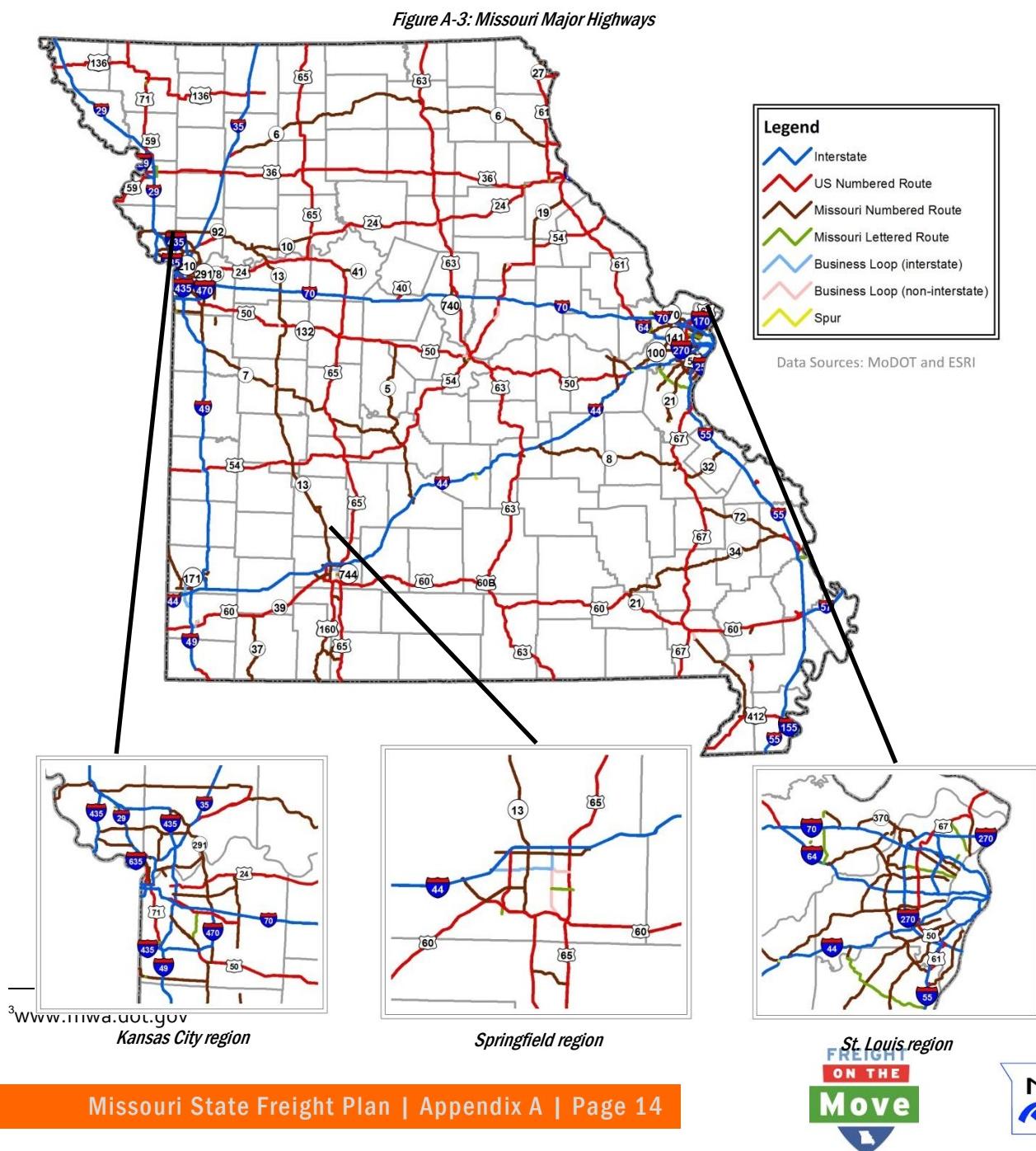
Figure A-3 depicts the Missouri major highway system which defines many of the paths on which freight moves. These major highways include Interstates, U.S. Highways, and most Missouri State Routes. The 28,200 miles of Missouri's State highway system include lesser traveled "minor highways"

Appendix A: Assets and Freight Flow Technical Memo

that primarily serve local transportation needs. These roads consist mostly of lettered routes, which are often farm-to-market routes, serving as a vital link to the agricultural industry throughout the State.

National Truck Network

In 1982 Congress passed the Surface Transportation Assistance Act (STAA), which imposed a federal 80,000 pound limit across the entire Interstate Highway Network. It also required states to allow these vehicles "reasonable access" to the National Network (or National Truck Network). The National Network includes Interstate highways and additional "Federal-Aid Primary" (FAP) roads that could safely accommodate STAA vehicles. The Missouri roadways which are designated on the National Truck Network are depicted in Figure A-4.³



Appendix A: Assets and Freight Flow Technical Memo

Figure A-4: Missouri Truck Route System



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Legend

Designated Truck Route

-  Federal Truck Route, Interstate Route
-  Federal Truck Route, US Route
-  State Truck Route, US Route
-  Federal Truck Route, State Route
-  State Truck Route, State Route

USA Major Cities (1:500k-1m)

-  1,000,000 and greater
-  500,000 - 999,999
-  250,000 - 499,999
-  100,000 - 249,999
-  50,000 - 99,999

Data Sources: MoDOT and ESRI

Appendix A: Assets and Freight Flow Technical Memo

Rail

The rail industry classifies the freight rail network into three distinct operating categories: Class I, II, and III. The Missouri Freight Plan will utilize these classifications as the basis to define the rail assets within Missouri.

Railroad Classification

Railroad classification is determined by the U.S. Surface Transportation Board (STB) based on annual revenue dollars. In 2012 dollars, a railroad with operating revenues greater than \$433.2 million⁴ for at least three consecutive years is considered a Class I railroad. Similarly, a railroad with revenues greater than \$34.7 million⁵, but less than \$433.2 million⁶, is considered a Class II railroad; such railroads are commonly referred to as "regional" railroads.

A railroad not within the Class I or II categories is considered a Class III railroad, also known as a "short line". As the name indicates, short lines operate over a relatively short distance. Short lines serve the larger railroads by collecting and distributing railcars to individual industrial and agricultural shippers and receivers. They provide a critical service, particularly in lower-density rail corridors and markets where the larger railroads cannot operate cost-effectively. From a historical standpoint, many of the nation's short lines operate on branches previously owned and operated by the Class I railroads.

In addition, Missouri has eight switching and terminal railroads that move traffic between railroads, pickup/deliver rail cars at ports or industrial areas. These railroads provide connecting services to get freight to and from its ultimate origin or destination.

The following is a brief discussion of the freight railroads operating in Missouri as reported by the Association of American Railroads (AAR) as of June 2013.

Class I Railroads

Missouri has a significant freight rail infrastructure with six Class I freight railroads currently operating 4,218 miles of rail line within the State. **Table A-6** depicts the locations of the railroads within Missouri. **Figure A-5** shows railroad ownership in Missouri.

Table A-6: Miles of Class I Railroads in Missouri

Class I Railroads in Missouri	
	Miles Operated in Missouri
BNSF Railway Company	1,759
CSX Transportation	13
Kansas City Southern Railway Co.	396
Norfolk Southern Corporation	409
Soo Line Railroad Co. (Canadian Pacific)	144
Union Pacific Railroad Co.	1,497

⁴ http://www.aslrra.org/about_aslrra/faqs/

⁵ http://www.aslrra.org/about_aslrra/faqs/

⁶ http://www.aslrra.org/about_aslrra/faqs/

Appendix A: Assets and Freight Flow Technical Memo

Total Miles Operated by Class 1 Railroads	4,218
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Source: Missouri State Rail Plan, MoDOT, 2012

Burlington Northern Santa Fe Railway Company (BNSF)

BNSF Railway operates one of North America's largest railroad networks, serving the western two-thirds of the U.S. It employs more than 40,000 people and operates on 32,000 route miles stretching across 28 States and two Canadian provinces.

- Headquarters: Fort Worth, TX
- Total System Mileage: 32,000 (28 States and Canada)
- Commodities Hauled: Waste or scrap materials; farm products; chemicals or allied products; waste hazardous materials or waste hazardous substances; coal, lumber or wood products (excluding furniture); transportation equipment; petroleum or coal products; non-metallic minerals; primary metal products.

BNSF operates the most rail infrastructure in Missouri with major rail junctions in Kansas City, Bucklin, Monroe City, St. Louis, Cape Girardeau, Springfield, and Carthage.

CSX Transportation (CSX)

CSX Corporation and its rail and intermodal businesses provide traditional rail service and the transport of intermodal containers and trailers. Its network encompasses about 21,000 route miles of track in 23 States, the District of Columbia and the Canadian provinces of Ontario and Quebec. It serves all Atlantic and Gulf Coast ports, as well as the Mississippi River, the Great Lakes, the St. Lawrence Seaway and (through western railroad alliances) U.S. Pacific ports.⁷ The CSX transportation network serves some of the largest population centers in the nation. More than two-thirds of Americans live within CSX's service territory. The western terminus of the CSX network is in East St. Louis, Illinois. While CSX does not own any Missouri trackage, according to their 2010 R-1 Report⁸ to the STB the company operates on 13 miles in the State via trackage rights, secured through part ownership of the St. Louis Terminal Railroad Association (TRRA).

- Headquarters: Jacksonville, FL
- Total System Mileage: 21,000 (23 States, DC and Canada)
- Commodities Hauled: Freight of all kinds; electrical machinery; equipment, or supplies; waste or scrap materials; chemicals or allied products; waste hazardous materials or waste hazardous substances; food or kindred products

CSX Transportation serves the St. Louis metropolitan area providing rail connections to the east coast.

Kansas City Southern Railway Co. (KCS)

The Kansas City Southern (KCS) is a transportation holding company headquartered in Kansas City. Its North American holdings include the Kansas City Southern Railway Company (serving the central and

⁷ <http://www.csx.com/index.cfm/about-csx/company-overview/>

⁸ Class I Railroad Annual Report to the Surface Transportation Board for the Year Ending December 31, 2010. CSX Transportation, Inc.

Appendix A: Assets and Freight Flow Technical Memo

south-central U.S.); Kansas City Southern de Mexico (serving northeastern and central Mexico and the port cities of Lázaro Cárdenas, Tampico and Veracruz); and a 50 percent interest in Panama Canal Railway Company (providing ocean-to-ocean freight and passenger service along the Panama Canal).⁹ KCS' North American rail holding and strategic alliances are primary components of a North American Free Trade Agreement (NAFTA) railway system, linking the commercial and industrial centers of the U.S., Mexico and Canada.¹⁰ According to its 2010 STB R-1 report, KCS owns 396 miles of track in Missouri and does not have any additional operational miles through trackage rights.¹¹

- Headquarters: Kansas City, MO
- Total System Mileage: 3,100 (10 States)
- Missouri Connecting Cities: Kansas City, Joplin
- Commodities Hauled: Farm products; lumber or wood products (excluding furniture); primary metal products; food or kindred products

KCS provides rail service to the north central and western regions of the State running through its corporate headquarters in Kansas City.

Norfolk Southern Corporation (NS)

Norfolk Southern Corporation (NS), through its Norfolk Southern Railway subsidiary, operates approximately 20,000 route miles in 22 States and the District of Columbia. NS serves every major container port in the eastern U.S. and operates the most extensive intermodal network in the East.¹² It is a major transporter of coal and industrial products and has major rail classification yards and intermodal terminals in Kansas City and St. Louis.

- Headquarters: Norfolk, VA
- Total System Mileage: 20,000 (22 States and DC)
- Major Local Facilities: Intermodal facilities located in Kansas City (Voltz Yard and Triple Crown Services Yard) and St. Louis (Luther Yard) and maintenance facilities in Kansas City, St. Louis, and Moberly
- Commodities Hauled: Agriculture; consumer and government; metals; construction; paper, clay and forest; chemicals; automotive; intermodal; coal; coke and iron ore

Norfolk Southern Corporation provides rail service through the north central region of the State, with major rail junctions in St. Louis, Monroe City, and Kansas City.

Soo Line Railroad Co. (CP)

The Canadian Pacific Railway (CP) operates on 14,800 miles of track in six Canadian provinces and 13 U.S. States. Kansas City is the southernmost point of the CP network. The Soo Line Railroad Co. is a Class 1 U.S. railroad, which is wholly owned by CP and does rail business under the CP name. The CP

⁹ <http://www.kcsouthern.com/en-us/AboutKCS/Pages/AboutKCSMain.aspx>

¹⁰ <http://www.kcsouthern.com/en-us/AboutKCS/Pages/AboutKCSMain.aspx>

¹¹ Class I Railroad Annual Report to the Surface Transportation Board for the Year Ending December 31, 2010. Kansas City Southern Railway Company.

¹² <http://www.nscorp.com/nsportal/nscorp/Media/Corporate%20Profile/>

Appendix A: Assets and Freight Flow Technical Memo

also operates the Dakota, Minnesota & Eastern Railroad Corporation (DM&E) and the Iowa, Chicago & Eastern (IC&E) Railroad.

IC&E territory covers 1,400 miles of track in Illinois, Iowa, Minnesota, Missouri, and Wisconsin. Its main lines extend from Chicago to Kansas City, and from Sabula, Iowa, along the Mississippi River northwesterly to the Minneapolis-St. Paul area, using trackage rights over the CP from La Crescent, Minnesota. Branch lines (known as the "Corn Lines") extend through Iowa from Marquette west to Mason City and Sheldon, and through Minnesota from Austin to Jackson and Rosemount.

- U.S. Headquarters: Minneapolis, MN
- Total System Mileage: 6,100 (18 States and provinces)
- Missouri Connecting Cities: Chillicothe
- Major Local Facilities: Kansas City, MO yard
- Commodities Hauled: Grains; automobiles; lumber; steel; chemicals

Missouri originated and destined cars handled in excess of 30,000 loads in 2011

The Canadian Pacific serves the Kansas City area providing rail connections to north central U.S. and Canada.

Union Pacific Railroad Co. (UP)

Union Pacific Railroad (UP) is an operating subsidiary of Union Pacific Corporation. Its operation covers 23 States in the western two-thirds of the U.S. The railroad links every major West Coast and Gulf Coast port and provides service to the east through its four major gateways in Chicago, St. Louis, Memphis and New Orleans. Additionally, Union Pacific operates key north/south corridors, serving all six major gateways to Mexico and interchanging traffic with the Canadian rail systems.

The rail system serves the country's fastest growing cities and states. UP serves the western coal reserves, Gulf Coast chemical industry and the rock quarries of south Texas. The railroad is the nation's largest hauler of chemicals and one of the largest intermodal carriers of truck trailers and marine containers. The railroad helps link production and consumption points in the U.S. and across the world, delivering energy, food, raw materials, durable and consumer goods to support the nation's growth.

The railroad has a diversified commodity mix, including chemicals, coal, food and food products, forest products, grain and grain products, intermodal, metals and minerals, and automobiles and parts. The largest of Union Pacific's 25,000 customers include steamship lines, vehicle manufacturers, agricultural companies, utilities, intermodal companies, and chemical manufacturers.

About 85 Union Pacific trains pass through Missouri daily. The UP facility in DeSoto, 40 miles south of St. Louis, is one of UP's three major freight car repair facilities. Kansas City is the site of a major UP freight classification yard, and the company operates terminals in St. Louis, Sedalia, Jefferson City, and Poplar Bluff. The UP also connects with four Missouri short line railroads: the Arkansas and Missouri, the Central Midland, the Missouri and Northern Arkansas, and the Semo Port. In 2010, UP handled more than 110,000 carloads originating from these short lines.

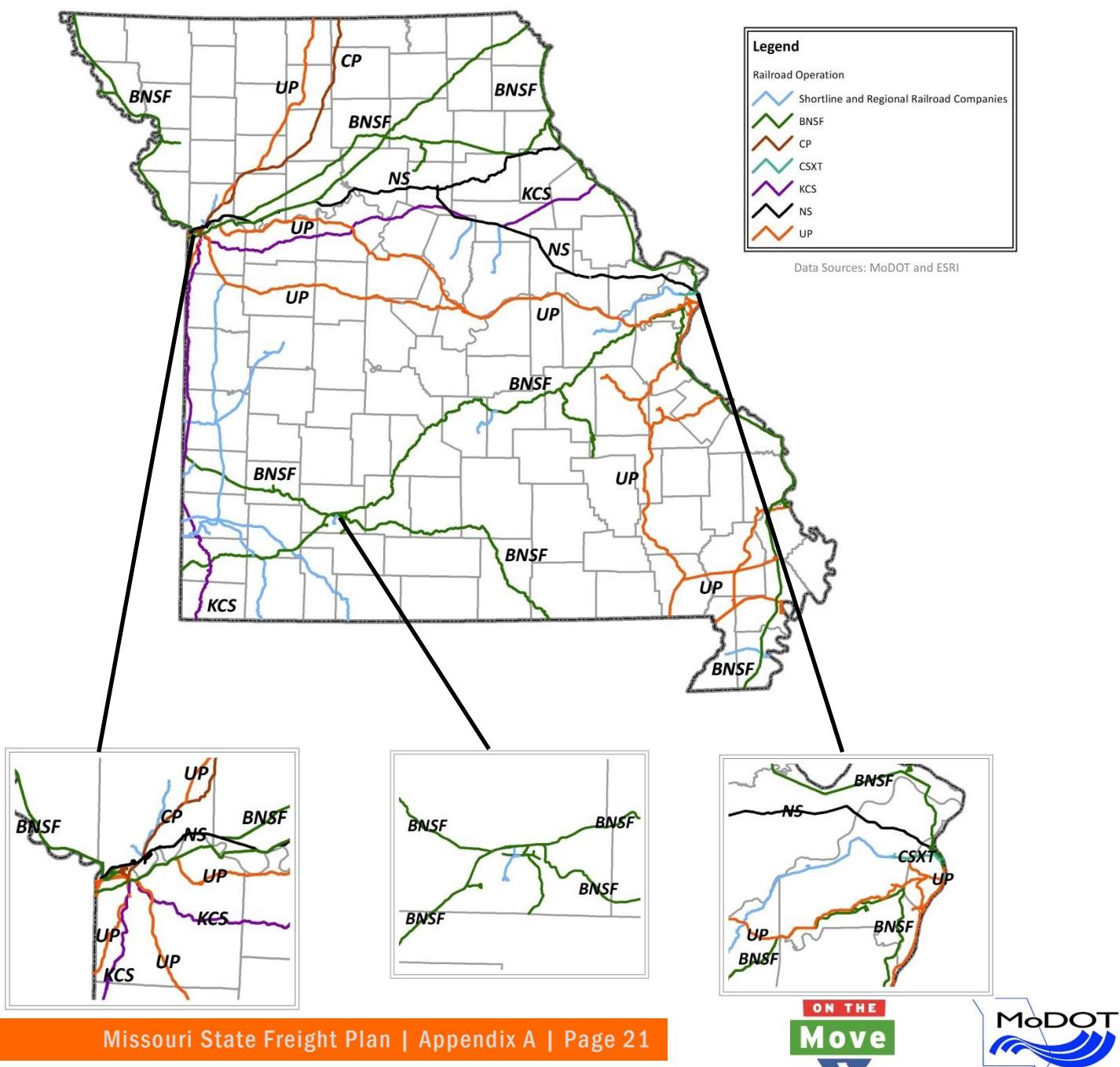
- Headquarters: Omaha, NE

Appendix A: Assets and Freight Flow Technical Memo

- Total System Mileage: 32,000 (23 States in the western two-thirds of the U.S.)
- Missouri Connecting Cities: Kansas City, Columbia, Jefferson City, St. Louis, and Cape Girardeau
- Major Local Facilities: Kansas City and St. Louis
- Commodities Hauled: Chemicals; coal; food and food products; grain and grain products; intermodal metals and minerals; automobiles and parts

Union Pacific Railroad serves the metropolitan areas of Kansas City, Jefferson City, St. Louis, Cape Girardeau, and Poplar Bluff.

Figure A-5: Railroad Ownership within Missouri



Appendix A: Assets and Freight Flow Technical Memo

Class II Railroads in Missouri

There are no Class II railroads operating in Missouri.

Short Lines (Class III Rail) in Missouri

Short line railroads connect Class I Railroads and commodity shippers and receivers. They often operate where it is not financially feasible for Class I Railroads to provide service. A total of five short line railroads, listed in **Error! Reference source not found.**, serve Missouri. These systems include a total of 450 track miles, 426 within Missouri, ranging from 33 to 331 track miles per operator.

Table A-7: Miles of Short Line Railroads in Missouri

Short Line Railroads in Missouri	
	Miles Operated in Missouri
Arkansas & Missouri Railroad (AMR)	33
Kaw River Railroad (KRR)	21
Missouri & Northern Arkansas Railroad (MNA)	331
Ozark Valley Railroad, Inc. (OVR)	33
South Kansas & Oklahoma Railroad (SKO)	8
Total mile operated by Local / Short Line Railroads	426

Source: Missouri State Rail Plan, MoDOT, 2012

Switching and Terminal Railroads in Missouri

Switching and Terminal Railroads are Class III railroads engaged primarily in providing these services for other railroads (i.e., they are not typically involved in line-haul moves between two geographical locations). They are often categorized with short line railroads due to their operational and revenue characteristics, except in cases where they are owned by one or more Class I carriers. **Table A-8** lists the Switching and Terminal Railroads in Missouri.

Table A-8: Miles of Switching and Terminal Railroads in Missouri

Switching and Terminal Railroads in Missouri	
	Miles Operated in Missouri
Central Midland Railway	52
Columbia Terminal	22
Kansas City Terminal Railway Co.	32
Manufacturers Railway Co.	7
Missouri & Valley Park Railroad Corp.	27
Missouri North Central Railroad	4
SEMO Port Railroad, Inc.	8
Terminal Railroad Assn. of St. Louis	26
Total Miles Operated by Switching & Terminal Railroads	178

Source: Missouri State Rail Plan, MoDOT, 2012

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Central Midland Railway

Central Midland Railway (CMR) operates 42 miles of the former Rock Island line between Vigus and Union, Missouri. CMR interchanges with the TRRA at Lackland. CMR is contracted by Ameren Corporation to operate the line owned by Missouri Central. The remaining 213 miles of the Rock Island Line between Union and Pleasant Hill is out of service, but is not formally abandoned.¹³

Columbia Terminal Railroad

The Columbia Terminal Railroad (COLT) is a full-service short line rail, trucking, and storage network serving mid-Missouri. It is owned and operated by the City of Columbia, Missouri.

The COLT railroad operates on 22 miles of track running between Columbia and Centralia where the railroad interconnects with Norfolk Southern. Shippers located in the COLT area work directly with Norfolk Southern for car supply, tariffs, billing, collections and general marketing. COLT handles more than 1,500 cars annually and carries aggregates, automotive parts, chemicals, coal, forest products and scrap metals. The line is rated FRA Class II, which allows train speeds of 25mph.¹⁴

Kansas City Terminal Railway Company

The Kansas City Terminal Railway (KCT) is a joint operation of the trunk railroads in the Kansas City metropolitan area, the country's second-largest rail hub. It is the nation's largest terminal railway by gross ton and is presently operated by the Kaw River Railroad.

The railway owns and dispatches 100 miles of track (34 in Kansas and 66 in Missouri) and leases six locomotives. It serves the Class I railroads: BNSF, Kansas City Southern, Norfolk Southern Railway, Union Pacific and Canadian Pacific/Soo (formerly DM&E) and Class III railroads: Missouri and Northern Arkansas Railroad; and Amtrak.

Manufacturers Railway Co.

The Manufacturers Railway Company (MRS) located in St. Louis is owned by the Anheuser-Busch brewing company. Its 3.6-mile line connects with the TRRA in St. Louis. Through trackage rights over the company's line on the MacArthur Bridge, MRS connects with the Alton and Southern Railroad in East St. Louis, Illinois. In March 2011, Anheuser-Busch applied to the Surface Transportation Board to discontinue all service on the MRS after the brewery began shipping outbound products via truck instead of rail. However, Anheuser-Bush later announced it would transfer all rail switching services to Foster Townsend Rail Logistics, Inc. (FTRL Railway) to support St. Louis brewery operations after Manufacturers Railway ceases operation.¹⁵

Missouri & Valley Park Railroad Corp.

Effective January 30, 2011, Burlington Junction Railway began operations in Fenton on the Valley Park line. The railroad serves online customers and a transload site in Fenton. The MVP interchanges with

¹³ http://www.progressiverail.com/where_we_go.html

¹⁴ www.gocolumbiamo.com/WaterandLight/About_Us/COLT/

¹⁵ <http://www.ftrail.com/>

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BNSF and has the capacity to handle loads up to 286,000 pounds. Its transload facility is near I-44 and I-270 and has an outdoor yard ramp for machinery and equipment loading/unloading. The facility can handle bulk transfer, including food grade, and offers warehousing and boxcar unloading and loading.

Missouri North Central Railroad

The Missouri North Central Railroad (MNC) serves an industrial park in Chillicothe through a lease with the City. Operations began in 2004 over 37 miles of track from Brunswick to Chillicothe in Northwest Missouri. The line from Sumner to Brunswick was subsequently abandoned. The line interchanges with the CP/Soo line (formerly the IC&E/DM&E) in Chillicothe and with the BNSF in Brunswick.

Semo Port Railroad, Inc.

The Semo Port Railroad (SE) provides local switch service to the port facilities in Scott City and provides interchange connections with both the UP and BNSF. It does so by a six-mile Union Pacific branch line purchased in 1994 by the Semo Port. A one-mile extension to Semo Port's harbor industrial area was completed in 1995.

Motive Rail Corporation is the rail freight service contractor, providing transportation and other services to SE under contract. Commodities hauled by the Semo Port Railroad include aggregates, chemicals, food and feed products, and steel and scrap metal. At Cape Girardeau, Semo Port Railroad connects with BNSF's main line between St. Louis and Memphis. Through St. Louis, the BNSF has routes to Chicago, St. Paul, Kansas City, Denver, and Seattle. Through Memphis, BNSF routes serve Birmingham, New Orleans, Houston, Dallas, California, and Mexico.

The SE's six-mile mainline is heavy welded rail (115 pounds and 133 pounds in curves). As a former UP branch, it handled heavy 100-car unit coal trains between southern Illinois and Missouri until 1990. The Harbor Lead track is 115 pound jointed rail. SE can handle 286,000- pound cars. Clearances allow movement of shipments handled on the main lines, including double-stack container cars.

At Capedreau Junction (east of Scott City), the Semo Port Railroad connects with UP's main line just west of the UP's double-track bridge over the Mississippi River.

Terminal Railroad Association of St. Louis

TRRA owns and operates the Merchants Bridge, the MacArthur Bridge, a rail switching facility in Madison, Illinois, and several key railroad routes in St. Louis, Missouri, and Madison and St. Clair Counties in Illinois.

The Merchants Bridge is a half-mile-long railroad-only bridge over the Mississippi River located just north of the downtown St. Louis area. Still a vital link in the company's operations, the Merchants Bridge was completed on March 18, 1890.

The MacArthur Bridge is part of a 6.2-mile-long elevated track crossing the Mississippi River in the heart of downtown St. Louis. The MacArthur Bridge and elevated track is the second-longest elevated steel structure across the Mississippi River. The MacArthur Bridge was originally constructed with a road deck over the rail deck; the bridge is currently used for railroad traffic only.

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The company's rail switching yard in Madison, Illinois, is the largest such facility in the region. Approximately 30,000 cars pass through the company's switching facility on a monthly basis and are redirected to other destinations. The switching yard consists of 80 tracks (inbound, outbound and holding) with a capacity of 2,200 cars at any one time. The company operates 30 locomotives to move cars around the yard, deliver cars to local industries, and ready trains for departure.

Railroad Connectivity

Railroads provide important connections to water ports and intermodal terminals. Missouri is uniquely positioned with the Mississippi and Missouri Rivers providing rail access to ship and barge traffic. **Table A-9** lists the major Missouri water ports that have direct rail access and their connecting railroads.

Table A-10 lists the NHS Intermodal Connectors that connect to truck/rail intermodal facilities.

Table A-9: Major Missouri Water Ports with Direct Rail Access and their Connecting Railroads

Missouri Ports with Connecting Railroads		
Port	Location	Connecting Railroads
Pemiscot County Port Authority	Mississippi River between Hayti and Caruthersville	BNSF
SEMO Port, Southeast Missouri Regional Port Authority	Mississippi River at Scott City	UP and BNSF
New Madrid County Port Authority	Mississippi River 175 miles south of St. Louis	UP
St. Louis Municipal River Terminal	Mississippi River at St. Louis	BNSF, UP, NS and CSX
Kansas City Port Authority	Confluence of the Missouri and Kansas Rivers in Kansas City	UP

Source: Missouri State Rail Plan, MoDOT, 2012

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Table A-10: NHS Intermodal Connectors to Truck/Rail Facilities

NHS Intermodal Connectors to Truck/Rail Facilities

Truck/Rail Facility	NHS Intermodal Connector Description
Burlington Northern, Kansas City	From I-29/35 (exit 6B): east 5.5 mi on Route 210 to facility entrance
Burlington Northern, Kansas City	From State Route 291: southwest 4.5 mi on Route 210 to facility entrance
Kansas City Southern, Kansas City	South on Chouteau Freeway from Route 210
Norfolk Southern/Triple Crown, Kansas City	From I-29/35 (exit 6B): east 5.5 mi on Route 210 to facility entrance
Norfolk Southern/Triple Crown, Kansas City	From State Route 291: southwest 4.5 mi on Route 210 to facility entrance
Norfolk Southern/Triple Crown, St. Louis	From, I-70 (exit 247); northeast 0.3 mi on Grand, northwest 1.5 on Hall to intermodal facility
Norfolk Southern/Triple Crown, St. Louis	From I-270 (exit 34); southwest 5.7 mi on Riverview Drive and continuing on Hall Street to terminal
Union Pacific, Kansas City	From Route 210 intermodal connector; south 2 mi on Chouteau Trafficway to facility entrance on Gardner Avenue

Source: FHWA

At-Grade Railroad Crossings

At-grade rail crossings present potential roadway safety and delay issues. There are over 5,600 at-grade railroad crossings within Missouri. **Table A-11** shows at-grade rail crossings by type, including freight railroad, Amtrak, and commuter rail operations. The intersection warning devices provided at those intersections are listed in **Table A-12**.

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Table A-11: Highway-Rail Grade Crossings by Type 2011

Highway-Rail Grade Crossings by Type 2011				
State	Total (number)	Public, motor vehicle (%)	Private, motor vehicle (%)	Pedestrian (%)
Missouri	5,697	60.3	38.9	0.8

Source: U.S. Department of Transportation, Federal Railroad Administration, Railroad Safety Statistics Preliminary Annual Report, table 9-2, available at safetydata.fra.dot.gov/OfficeofSafety/publicsite/Prelim.aspx as of April 2013.

Table A-12: Warning Devices at Public Highway-Rail Grade Crossings

Warning Devices at Public Highway-Rail Grade Crossings									
Percent of Total									
State	Total (number)	Cross bucks*	State (%)	Flashing lights	Stop signs	Unknown (%)	Special warning (%)	Highway Traffic Signals, Wigways, bells (%)	Other (%)
<small>*white x-like signs that indicate railroad crossing</small>									
Missouri	3,436	46.1	26.5	19	3.3	2.7	1.4	1	0.1

Source: USDOT, Bureau of Transportation Statistics 2012

Water

Moving \$12.5 billion in cargo in 2012, Missouri waterways provide low-cost transportation benefits to businesses from around the globe. The Missouri and Mississippi Rivers are part of a large inland waterway network connecting 21 States with access through the Gulf of Mexico and the Great Lakes to the international maritime markets.

A previous collection of studies has been reviewed along with more recent data from TRANSEARCH on freight movements. Previous studies include: *Missouri Public Port Authorities: Assessment of Importance and Needs (2006)*, *Update of Missouri Public Port Authority Assessment (2007)*, *Freight Optimization and Development in Missouri: Ports and Waterways Module (2008)*, and the *Missouri River Freight Corridor Assessment and Development Plan (2011)*.

Missouri Waterways

Missouri sits in the heart of the Mississippi River Valley, with the Missouri and Illinois Rivers converging near St. Louis and the Ohio River converging at Cairo, Illinois, just across the Missouri stateline. Missouri contains approximately 1,050 miles of navigable rivers, including 500 miles of the Mississippi River, and 550 miles of the Missouri River. The Mississippi River is divided into the Upper Mississippi (860 miles) limited by a series of locks and dams and the Lower Mississippi (1,480 miles) with uninterrupted flow south to the Gulf of Mexico.

Public Ports

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A total of 14 public port authorities and over 200 private ports can be found along Missouri's waterways. Three public port authorities and over 50 private ports operate along the Missouri River; 11 public port authorities and over 150 private ports operate on the Mississippi River. The 14 public port authorities occupy roughly 2,000 acres of land and currently report service to 36 counties and six other states.¹⁶

A Port Authority is the organizational and decision-making body that guides the development of public ports as established by the Missouri General Assembly. A Port Authority encourages economic development and job creation, approves any construction that may take place at the public port, prevents or removes obstructions in harbor areas, acquires right-of-way within port districts, and disburses funds for activities, among other duties. There are different categories of public port authorities: active, inactive, and developing ports. There are six active public ports which have shipped product within the last year. There are three inactive public ports which have a public port facility but did not ship product within the last year. There are five developing public ports which currently do not have a public port facility. **Table A-13** lists the public port authorities and **Figure A-6** shows their locations.

Table A-13: Public Port Authorities status, location, and transportation access.

Public Port Authorities			
Port	Status	Location	Transportation Access
City of St. Louis Port Authority	Active	Mississippi River (mile 171.9 to 191.2)	Road: I-70, I-64, I-55, I-44; Rail: six Class I railroads; Air: two international airports; Pipeline: two major transcontinental
Howard/Cooper County Regional Port Authority	Inactive	Missouri River (mile 196.5)	Road: I-70, US-40 & 87, & MO-5; Rail: Union Pacific Railroad
Jefferson County Port Authority	Developing	Mississippi River (specific location to be determined)	Road: I-55 and US-61/67; Rail: Union Pacific & BNSF Railroads
Kansas City Port Authority	Inactive	Missouri River (mile 367.1)	Road: I-70, I-35, I-29 and US-71 (I-49); Rail: Union Pacific Railroad; Air: KCI & KC Municipal Airports
Lewis County-Canton Port Authority	Active	Mississippi River (Pool 21)	Road: US- 61; Rail: BNSF Railroad
Marion County Port Authority	Developing	Mississippi River (specific location to be determined)	Road: I-72, US-24, US-36, US- 61 Rail: BNSF Railroad, Norfolk Southern
Mississippi County	Developing	Confluence of the	Road: US-60

¹⁶ Missouri Public Port Authorities: Assessment of Importance and Needs, 2006.

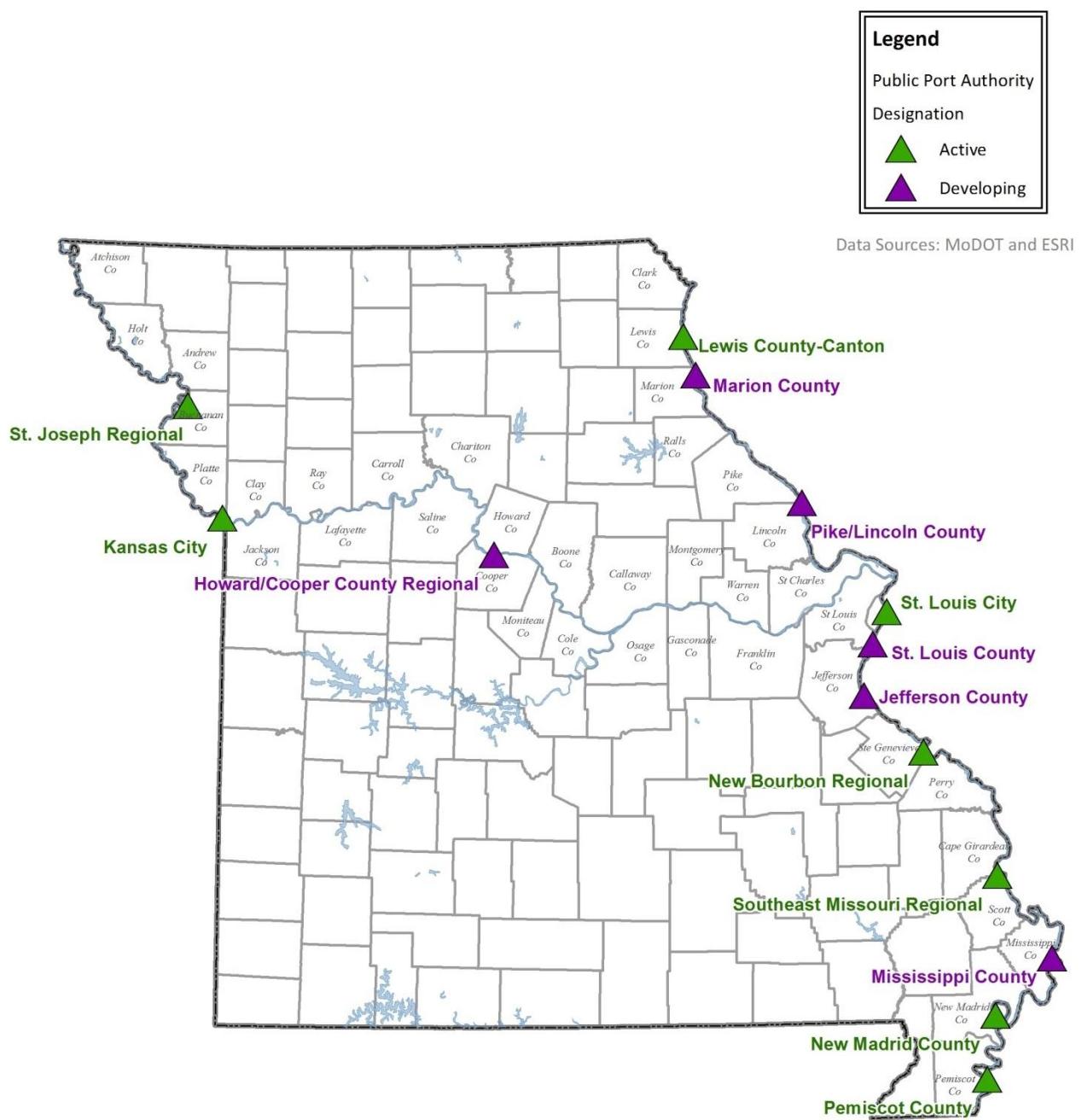
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Port Authority		Ohio and Mississippi Rivers (specific location to be determined)	
New Bourbon Regional Port Authority	Active	Mississippi River - Upper River mile 120.5	Road: US-61 & I-55; Rail: BNSF Railroad
New Madrid County Port Authority	Active	Mississippi River (885)	Road: I-55 Rail: Union Pacific Railroad
Pemiscot County Port Authority	Active	Mississippi River (849.9)	Road: I-55, I-155/US-412; Rail: BNSF Railroad
Pike/Lincoln County Port Authority	Developing	Mississippi River (specific location to be determined)	Road: US-61, 54 & MO-79; Rail: KC Southern and BNSF Railroad
SE Missouri Regional Port Authority	Active	Mississippi River (Upper River mile 48)	Road: I-55, I-57, I-24, I-64 & US-60; Rail: Union Pacific and BNSF Railroads
St. Joseph Regional Port Authority	Inactive	Missouri River (448)	Road: I-29, I-229 & US-36; Rail: Union Pacific and BNSF Railroads Air: St. Joseph Rosecrans Memorial Airport
St. Louis County Port Authority	Developing	Mississippi River (specific location to be determined)	Road: I-70, I-64, I-55, I-44; Rail: six Class I railroads; Air: two international airports; Pipeline: two major transcontinental

Source: <http://www.missouriports.org/index.html>

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Figure A-6: Public Port Authorities



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Active Public Ports

City of St. Louis Port Authority, Mississippi River

The City of St. Louis Port Authority (**Figure A-7**) has easy access to the Illinois River and the Missouri River as it sits at the intersection of U.S. Department of Transportation Marine Highways, M70 and M55. This is the second largest inland port by trip-ton miles, and third largest by tonnage.¹⁷ There are over 130 piers, wharves, docks, fleeting, and other facilities with 16 public terminals. Twenty-nine industrial centers with a population of 90 million can be reached from St. Louis by barge. Industrial development sites are available in the City's 3000-acre North Riverfront Business Corridor.

Figure A-7: City of St. Louis Port Authority



Source: <http://www.missouriports.org/citystlouis.html>

Lewis County – Canton Port Authority

The Lewis County – Canton Port facility handles barge operations supporting grain, liquid fertilizer and dry bulk commodities.

Figure A-8: New Madrid County Port Authority



Source: <http://www.missouriports.org/madrid.html>

New Bourbon Regional Port Authority

The Port of New Bourbon has barge access to Chicago, Memphis, Gulf Ports and ocean shipping services. There is transfer capability for inbound/outbound general cargo, aggregates and bulk commodities. The port can accommodate truck-to-barge/barge-to-truck transfers. There are building and storage sites available.

New Madrid County Port Authority

The Port of New Madrid County (**Figure A-8**) is located within the 4,200-acre St. Jude Industrial Park. This area is a designated Enterprise Zone. The facility is accessible by barge, truck and rail. Acreage is available for development within the industrial park.

Pemiscot County Port Authority

The Pemiscot County Port (**Figure A-9**) has transportation links to all surrounding cities, including St. Louis and Memphis. Forty-three percent of the total U.S. population and 42% of the total U.S. manufacturing establishments are within a two-day drive. There are 30 acres of port-owned building sites available. This area is a designated Enterprise Zone. Enhanced Enterprise Zones are specified

Figure A-9: Pemiscot County Port Authority



Source: <http://www.missouriports.org/pemiscot.html>

Figure A-10 Southeast Missouri (SEMO) Regional Port Authority



Source: <http://www.missouriports.org/southeast.html>

¹⁷ <http://www.missouriports.org/citystlouis.html>

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geographic areas designated by local governments and certified by the Department of Economic Development. Zone designation is based on certain demographic criteria, the potential to create sustainable jobs in a targeted industry, and a demonstrated impact on local industry cluster development.

Southeast Missouri (SEMO) Regional Port Authority

The SEMO Port (**Figure A-10**) handles general cargo, dry bulk commodities and project cargo. The port provides barge access to Gulf ports and worldwide open shipping services. Same day truck service is available to St. Louis, Nashville, Memphis, and Kansas City with next day truck service to Chicago, Atlanta, and Dallas. There is land available for development with existing leases on additional acreage.

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Inactive Public Ports

Howard/Cooper County Regional Port Authority

The Howard/Cooper County Regional Port Authority (**Figure A-11**) is the only public shipping access between Kansas City and St. Louis. There are no locks or dams obstructing the channel of the Missouri River from this site to its junction with the Mississippi River in St. Louis. There is capacity for grain, liquid chemicals, and dry storage. Thirty-five prime industrial acres are available for development. Currently this Port is considered inactive.

Kansas City Port Authority

The Kansas City Port Authority is one of the largest storage and distribution centers serving the Missouri River. This is a true intermodal facility, transferring product between barge, rail, and truck. The terminal effectively serves any area within a 200-mile radius of Kansas City, Missouri. There are 145 acres available for industrial or retail development. This Port is currently categorized as inactive.

St. Joseph Regional Port Authority

The St. Joseph Regional Port Authority (**Figure A-12**) is located 50 minutes from downtown Kansas City, MO, and two hours from Omaha, NE. This location is within 500 miles of 43 percent of the U.S. Population and 44 percent of the U.S. manufacturing establishments. There is potential for industrial development with 31 acres in redeveloped Stockyards Industrial Park, minutes south of the park on MO-759. The Port is currently considered inactive.

Figure A-11: Howard/Cooper County Regional Port Authority



Source: Missouri Public Port Authorities: Assessment of Importance and Needs

Figure A-12: St. Joseph Regional Port Authority



Source: <http://www.missouriports.org/stjoseph.html>

Developing Public Port Authorities

Jefferson County Port Authority

Jefferson County does not currently have a port facility. The objective of the port authority has been to buy land and develop a port in the near future. The location of Jefferson County is prime for waterway development due to the long Mississippi River border and intermodal access near the river. The port site is undeveloped today and lacks adequate highway infrastructure suitable for a port or any commercial development.

Marion County Port Authority

Marion County Port Authority plans have included building a port to support development of an ethanol

Figure A-13: Mississippi County Port Authority



Source: <http://www.missouriports.org/mississippi.html>

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plant on site, adding a biofuel plant and developing new intermodal capabilities for Container-on-Vessel (COV).

Mississippi County Port Authority

The location of the Mississippi County Port (**Figure A-13**) allows year-round access for barge operators as the northern-most ice-free area on the Mississippi. Vehicle ferry service operates seven days a week on a continuous basis from Dorena, Missouri to Hickman, Kentucky. The port authority is situated on 18 acres with nearly 1,900 feet of river frontage. Currently Mississippi County Port falls into the developing category.

Pike/Lincoln County Port Authority

The Pike and Lincoln County port is a developing port with barge service provided via the Mississippi River. Many existing businesses already take advantage of this form of transportation to distribute their products and bring in raw materials. There is currently no port at this location.

St. Louis County Port Authority

Efforts to bring commercial uses to the St. Louis County Port Authority site have not succeeded due to extensive remediation, lack of flood protection, and limited access to other transportation modes. Some work has been done to improve access issues. The port is considered developing at this time.

Private Ports

There are over 200 private ports in Missouri that include marinas and docks that directly connect businesses to waterways. While these are obviously important to Missouri, they do not receive funding from MoDOT's multimodal section, and were considered beyond the scope of this study.

Locks & Dams

The lock and dam system, under the jurisdiction of the U.S. Army Corps of Engineers, was implemented to control the river levels and provide more reliable navigation. The seven locks and dams adjacent to Missouri, listed in **Table A-14**, are part of the Upper Mississippi River starting just north of St. Louis to the Iowa border. The Lower Mississippi River (south of St. Louis) and the Missouri River contain no locks or dams.

Table A-14: Listing and Location of Locks and Dams Adjacent to Missouri

Missouri's Locks and Dams	
Lock/Dam Number	Location
No. 20	Canton, MO
No. 21	Quincy, IL
No. 22	Saverton, MO

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No. 24	Clarksville, MO
No. 25	Winfield, MO
No. 26 (Melvin Price)	East Alton, IL
No. 27 (Chain of Rocks Dam)	Glasgow Village, MO
No. 27 (Chain of Rocks Lock)	Granite City, IL

Source: U.S. Army Corps of Engineers

Maritime Highways

Since 2009, the U.S. Department of Transportation has designated several marine highways for transporting cargo on water, reducing pollution and congestion on roads. Designated marine highways receive preferential treatment for federal assistance from the U.S. Maritime Administration (MARAD). Maritime highways serving Missouri include M-29 covering the Upper Missouri River from Kansas City to Sioux City, Iowa; M-70 covering the Missouri River from Kansas City to St. Louis; M-35 from St. Louis to the Twin Cities, and M-55 covering the Mississippi River from St. Louis to the Gulf of Mexico and from St. Louis to Chicago.

Air

The Federal Aviation Administration (FAA) categorizes public use airports into the following categories: Primary Commercial Service Airports, Non-primary Commercial Service Airports, Reliever Airports, and General Aviation Airports. Primary Commercial Service Airports are further broken down into subcategories of Large Hub, Medium Hub, Small Hub, and Non-hub depending on their percentage of total U.S. passenger enplanements. Commercial Service Airports are those with at least 2,500 annual passenger enplanements and regularly scheduled commercial airline traffic.¹⁸

The quantity of air cargo moving between origin and destination points, and also the amount of cargo transferring via an airport, is closely related to airport infrastructure capacity. Missouri's busiest cargo airports are located near major metropolitan areas that produce consistent passenger and air cargo traffic. Consequently, these facilities must be able to support large aircraft capable of accommodating market demand. The State's smaller airports, generally located near Missouri's medium-sized metro areas, generally have infrastructure capable of supporting smaller-scale air cargo operations. These airports can be used to move cargo traffic to larger airports and airports outside of the State.

The movement of air cargo takes place via one of three types of carriers: all-cargo, integrated express, or on passenger airlines as belly cargo. Integrated express operators rely on a hub-and-spoke system to move the customer's goods door-to-door, providing shipment, collection, transport via air/truck, and delivery. Integrated express operators include FedEx Express, UPS, and formerly DHL (domestic pickup and delivery service discontinued in January 2009). All-cargo carriers operate airport-to-airport freight services for their customers but do not offer passenger service. All-cargo carriers include China Cargo, Capital Cargo International, USA Jet Airlines, and Kalitta Charters, to name a few. Internationally, Aeromexico, Air Canada, Air Transport International, United Cargo and Volga-Dnepr Airlines are passenger airlines with their own fleet of dedicated freighter aircraft. All-cargo carriers offer scheduled

¹⁸ http://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/categories/

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service to major markets throughout the world using wide body and/or containerized cargo aircraft. Air cargo services, or “belly cargo,” provided by passenger airlines vary in scope and size from airline to airline, based on differences in aircraft operating fleet. A regional airline with a fleet of turboprop and regional jets cannot accommodate bulky cargo. Airlines operating wide body aircraft have containerized lower decks and are capable of handling large shipments. These air cargo networks are supplemented in the air by regional/feeder airlines and on the ground by freight forwarders/road feeder service (RFS) trucking companies.

Air cargo is typically lightweight, time-sensitive, and high-value. Common examples of air freight include perishables (flowers, fish, produce), computers and peripherals, telecommunications equipment, vehicle parts, oil and gas drilling equipment, pharmaceuticals, clothing, medical supplies and equipment, beauty supplies, as well as many others. It is impossible to know exactly what items are shipped as this information is not published by carriers. An aircraft may have a wide-ranging mixture of any of the above items on board. Assumptions can be made based on the economies of the markets being served; however, any assumptions would be speculative. Missouri is home to three of the top 110 cargo airports in North America in terms of total tonnage in 2012 listed in **Table A-15** and shown in **Figure A-14**.

Table A-15: Missouri's Top Freight Airports Listing, Location, 2001 and 2013 Cargo Tonnage and Ranks

Missouri's Top Freight Airports							
ID	Airport Name	Associated City	2001 Total Cargo Tonnage	2013 Total Cargo Tonnage	2001-2013 CAGR*	North American Rank 2013	Global Rank 2013
MCI	Kansas City International Airport	Kansas City	142,563	99,354	-2.96%	37th	152nd
STL	Lambert - St. Louis International Airport	St. Louis	122,184	64,557	-5.18%	56th	N/A
SGF	Springfield-Branson National Airport	Springfield	11,337	12,693	0.95%	106th	N/A

Source: Airport Council International - North America (ACI-NA)

**CAGR = Compound Annual Growth Rate*

These three airports handled nearly 177,000 tons of total air cargo in 2013, which represents a decrease of 3.7 percent annually since 2001. In this same time frame, Missouri's fastest growing airport by total tonnage was Springfield-Branson National (SGF) at 0.95 percent annually. Kansas City International and Lambert – St. Louis International both experienced losses in total air cargo from 2001-2013. These airports handling freight are discussed in this section.

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Figure A-14: Missouri's Top Freight Airports



Connections between the cargo airports and the highway networks are integral to the movement of freight from these gateways. **Table A-16** identifies the Interstate Highways that are within 90 miles of these major air cargo airports in Missouri.

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Table A-16: Interstates in Proximity (within 90 miles) to Cargo Airports.

Interstates	MCI	STL	SGH
I-29	X		
I-35	X		
I-44		X	X
I-49	X		X
I-55		X	
I-64		X	
I-70	X	X	
I-170		X	
I-255		X	
I-270		X	
I-435	X		
I-470	X		
I-635	X		
I-670	X		

Source: CDM Smith

Kansas City International

Kansas City International (MCI) is the primary airport serving the Kansas City metropolitan area. Located approximately 15 miles north of downtown Kansas City, MCI has three runways ranging from 9,500 feet to 10,801 feet. It is the busiest airport in Missouri regarding annual air cargo tonnage and moves more air cargo each year than any air center in a six-state region. In 2013, 99,354 tons of freight and mail passed through MCI, which ranks 37th in the U.S./North America and 152nd globally.

Air carriers benefit from many of MCI's competitive advantages such as direct highway access, central North American location, 252,000 square feet of cargo warehouse space, 1.27 million square feet of apron area, and three runways. In addition, MCI has a U.S. Postal Service (USPS) facility with airside access, as well as an on-airport trucking terminal that provides another 30,000 square feet of warehouse.

FedEx has been MCI's largest cargo carrier (in annual volume) every year since 1995. The FedEx development was financed with \$10.5 million of bonds issued by the Industrial Development Authority of Kansas City, Missouri. In 1997, FedEx completed an 85,000-square-foot regional hub building at MCI that is capable of handling 6,000 packages per hour. The facility is designed to accommodate two wide body and four narrow body aircraft in its current configuration.

MCI encompasses 10,200 acres of land with a large area designated for cargo facilities. All-cargo carriers at MCI include DB Schenker, DHL, FedEx, and UPS. These carriers represent flights from MCI, to markets throughout North America and Canada. KCI's concentrated landside cargo facilities are well-served for aviation and trucking resources, all accessible by Mexico City Avenue. Mexico City Avenue functions as a "designated cargo road", which has its own connection to I-29, thereby segregating the truck traffic from passenger traffic. Mexico City Avenue is classified as a four-lane

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principal arterial with a standard capacity of up to 24,000 vehicles per day. According to traffic counts recorded in spring 2007 at Mexico City Avenue between Prairie View Road and Paris Street, there are approximately 8,200 vehicles traveling on Mexico City Avenue per day.

In addition to the cargo carriers at MCI, numerous passenger airlines provide cargo lift capacity on routes operated with wide-body passenger aircraft. These aircraft have space designed to hold cargo containers in the belly of the aircraft and serve international destinations in Canada and Mexico. MCI is a major hub for Southwest Airlines, which provides service to numerous domestic and international cities. Kansas City International's domestic and international air cargo routes are illustrated in **Table A-17** and **Figure A-16**.

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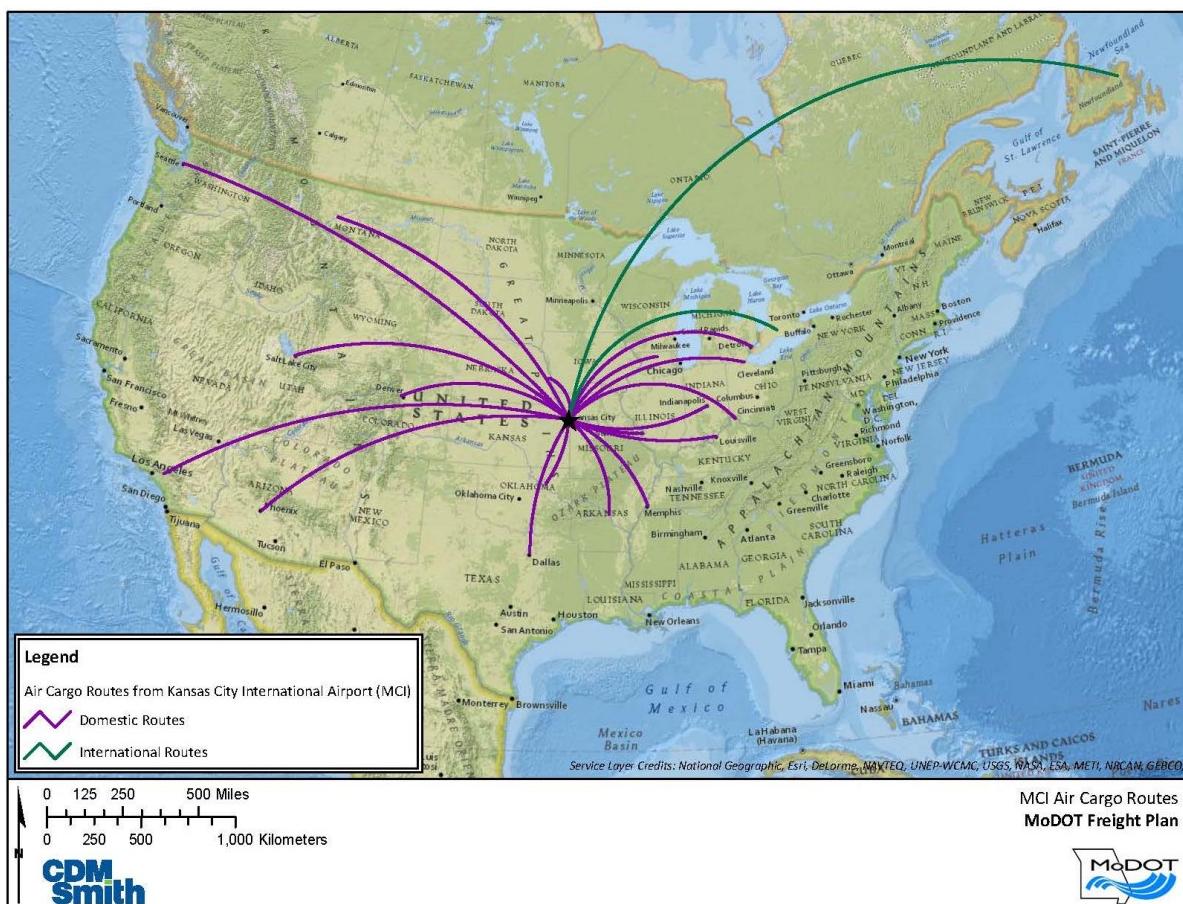
Table A-17: Kansas City Air Cargo Destination Airports

Kansas City Air Cargo Destination Airports

Kansas City to:	Destination	Kansas City to:	Destination
MCI to:	Cincinnati, OH	MCI to:	Memphis, TN
MCI to:	Dallas/Fort Worth, TX	MCI to:	Omaha, NE
MCI to:	Denver, CO	MCI to:	Ontario, CA
MCI to:	Detroit, MI	MCI to:	Phoenix, AZ
MCI to:	Great Falls, MT	MCI to:	Rockford, IL
MCI to:	Gander, Canada	MCI to:	Salt Lake City, UT
MCI to:	Indianapolis, IN	MCI to:	Seattle, WA
MCI to:	Little Rock, AR	MCI to:	St. Louis, MO
MCI to:	Louisville, KY	MCI to:	Toledo, OH
MCI to:	London, Canada	MCI to:	Tulsa, OK

Source: Bureau of Transportation Statistics, Research and Innovative Technology Administration, Internet Lookup, 2014

Figure A-16: MCI Domestic and International Air Cargo Routes



Source: Bureau of Transportation Statistics, Research and Innovative Technology Administration, Internet Lookup, 2014

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Lambert-St. Louis International Airport

Lambert-St. Louis International Airport (STL) is situated on 2,800 acres of land and has four runways, the longest of which measures 11,019 feet in length. It is located approximately 10 miles northwest of St. Louis. It is the second busiest airport in Missouri in terms of annual air cargo tonnage, but the busiest airport in terms of passenger enplanements. In 2013, STL handled 64,557 tons of freight and mail, which ranks 56th in the U.S./North America.

STL is served by three major dedicated cargo airlines. Operators include integrated express carriers such as FedEx Express, UPS, and DHL. STL was formerly a major cargo hub, as the home base of Trans World Airlines (TWA), until the latter's absorption into American Airlines in 2001. TWA's St. Louis hub decreased after the merge due to its proximity to American Airline's larger hub at Chicago's O'Hare International Airport. As a result, STL went from 800 daily flights with TWA to having fewer than 200 daily flights with American. After the merge of TWA into American Airlines cargo tonnage at STL decreased from 130,000 tons in 2000 to 120,000 tons in 2002. MCI had a similar decrease in cargo from 2000-2002 (151,000 to 135,000).

Today's cargo area includes 231,500 square feet of fully-equipped cargo transit sheds, bonded warehouses, high-security warehousing, special handling facilities, freighter parking stands and direct ramp access.

In addition, numerous passenger airlines serving St. Louis provide cargo storage capacity on routes operated with wide-body aircraft. This cargo capacity is utilized primarily on international routes where wide-body aircraft are necessary. STL and its airlines serve the region with wide-body flights to many international destinations in Canada, Mexico, and China. Air Canada is an example of an international wide-body operator.

STL's location allows easy access to all forms of multi-modal transportation, while its immediate proximity to Foreign Trade Zone No. 102 allows businesses that utilize the zone to take advantage of significant cost savings.

Common goods shipped through STL include aerospace equipment, computers, auto parts, clothing and shoes, and paper products.

STL has wide-body passenger connections to Mexico, Canada, and China that operate passenger and belly cargo services. STL International's domestic air cargo routes are illustrated in **Table A-18** while its international air cargo routes are illustrated in **Figure A-17**.

Table A-18: St. Louis Air Cargo Destination Airports

St. Louis Air Cargo Destination Airports	
Destination	Destination
Arlington, TX	Mexico City, Mexico
Cincinnati, OH	Minneapolis, MN
Denver, CO	Oakland, CA
Hamilton, Canada	Portland, OR
Houston, TX	Rockford, IL

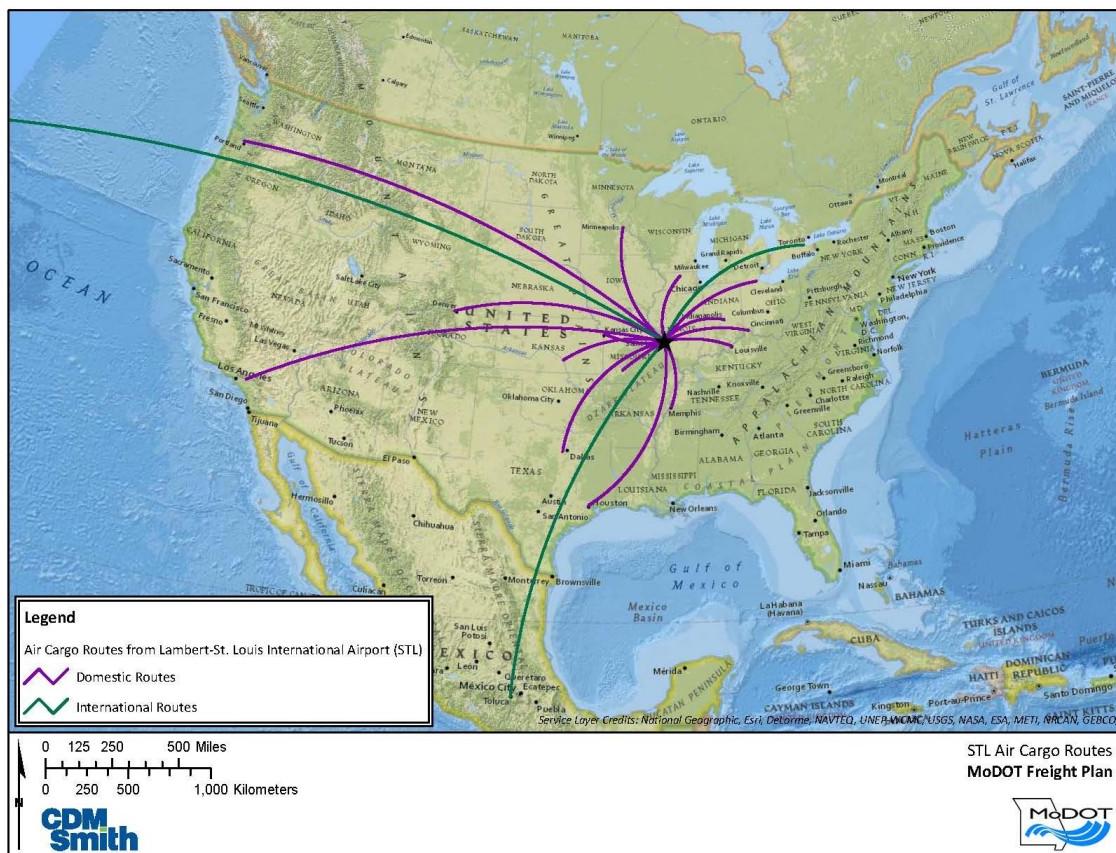
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Indianapolis, IN	Shanghai, China
Kansas City, MO	Springfield, MO
Louisville, KY	Toledo, OH

Source: Bureau of Transportation Statistics, Research and Innovative Technology Administration, Internet Lookup, 2014

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Figure A-17: STL Domestic and International Air Cargo Routes



Source: Bureau of Transportation Statistics, Research and Innovative Technology Administration, Internet Lookup, 2014

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Springfield-Branson National Airport

Springfield-Branson National (SGF) is located approximately 5 miles northwest of the City of Springfield, Missouri. SGF maintains one 7,003-foot runway and one 8,000-foot runway. It was the third busiest airport in Missouri by both passenger enplanements and annual air cargo tonnage. In 2013, SGF handled 12,693 tons, ranking 106th in the U.S. SGF has a Foreign Trade Zone (FTZ) designated facility on site. This means that foreign merchandise entering the FTZ can be re-exported, and in this case customs procedures are streamlined and tariffs do not apply.

American Airlines, Allegiant Air, Delta, and United are the four passenger air carriers that provide air service from SGF to various destinations throughout the U.S. However, passenger airlines serving SGF currently do not provide major cargo service from this location. Springfield-Branson National's domestic air cargo routes are illustrated in **Table A-19** and **Figure A-18**.

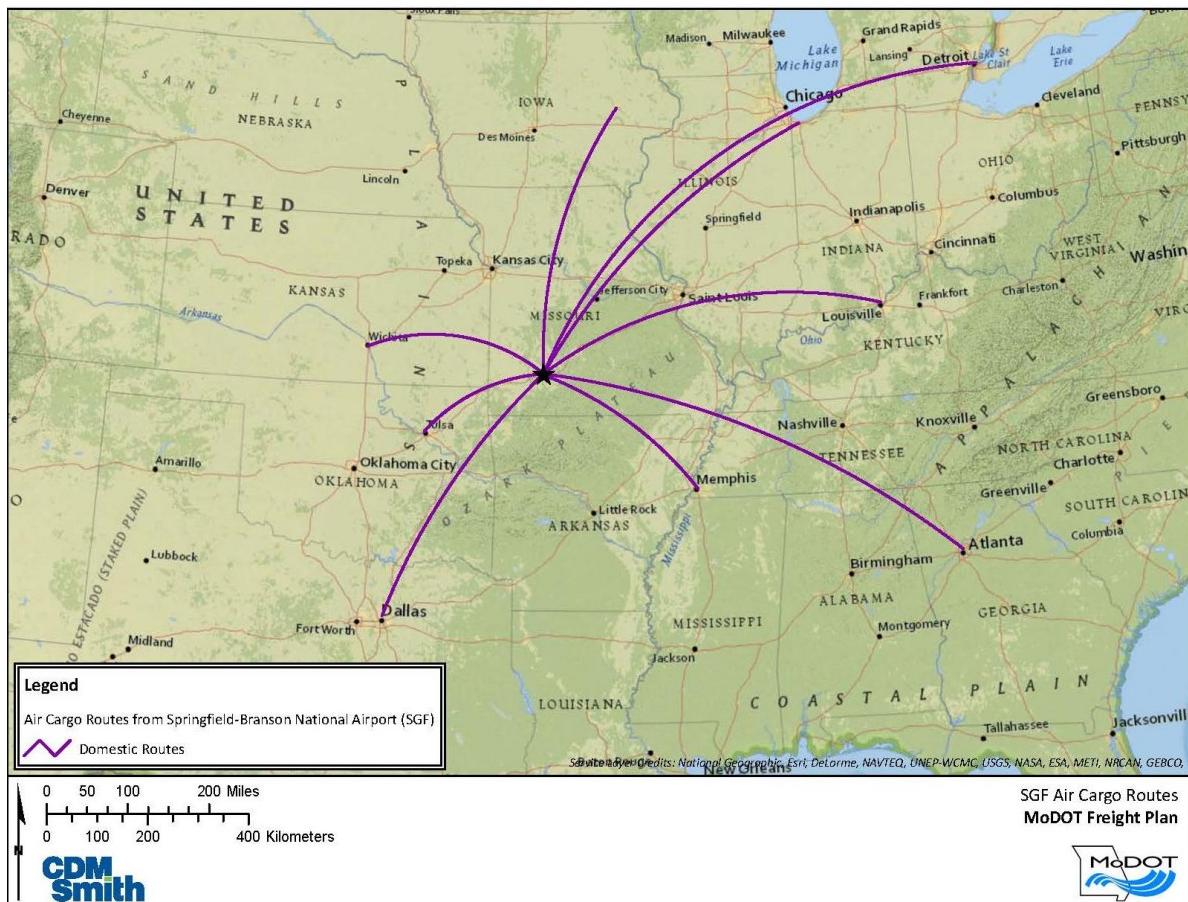
Table A-19: Springfield Air Cargo Destination Airports

Springfield Air Cargo Destination Airports	
Destination	Destination
Atlanta, GA	Louisville, KY
Cedar Rapids/Iowa City, IA	Memphis, TN
Dallas/Fort Worth, TX	Tulsa, OK
Detroit, MI	Wichita, KS
Gary, IN	

Source: Bureau of Transportation Statistics, Research and Innovative Technology Administration, Internet Lookup, 2014

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Figure A-18: Springfield Domestic Air Cargo Routes



Source: Bureau of Transportation Statistics, Research and Innovative Technology Administration, Internet Lookup, 2014

Pipeline

Approximately 10,700 miles of pipelines move natural gas, crude oil, and petroleum products throughout Missouri. **Table A-20** lists the number of pipeline miles by commodity. The U.S. DOT Pipeline and Hazardous Materials Safety Administration (PHMSA) regulates pipeline transport. The Office of Pipeline Safety (OPS – within PHMSA) inspects and enforces interstate pipeline safety regulations and certifies State representatives, through the Missouri Public Service Commission, for intrastate inspection.

Table A-20: Missouri Pipeline Transmission Mileage by Commodity

Missouri Pipeline Transmission Mileage by Commodity

Commodity	Pipeline Miles
Natural Gas	4,587
Refined Products	2,046
Crude Oil	1,591
Liquefied Petroleum Gas HVL	1,132
Empty Liquid	790
Anhydrous Ammonia HVL*	420

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Natural Gas Liquids HVL*	153
Total Pipeline Miles	10,719

*HVL=highly volatile liquid

Source: http://primis.phmsa.dot.gov/comm/reports/safety/MO_detail1.html?nocache=6500#_OuterPanel_tab_5
Accessed on February 5, 2014

The highest percentages of pipeline miles, according to PHMSA Missouri Incident and Mileage Overview, are in St. Charles County (4.9 percent), Cass County (3.6 percent), Audrain County (3.5 percent), and Johnson County (3.4 percent), which are located in the northern half of the State where the majority of major pipelines pass.¹⁹

There are several major crude oil, petroleum product, and liquefied petroleum gas pipelines traversing the State as identified by the PHMSA. Many of the crude oil and petroleum product pipelines originate near the Gulf Coast (Texas) and Oklahoma, as well as Canada, and pass through the State en route to Midwest refineries, including the Wood River, Illinois, refinery across the Missouri border near St. Louis. Natural gas supplies are primarily from the south-central U.S. and Rocky Mountain region including Oklahoma, Texas, and Colorado. **Table A-21** lists the major pipelines in Missouri and their extents and **Figure A-19** shows their locations.

The Energy Information Administration (EIA) maintains a database of recently completed and upcoming U.S. natural gas pipeline projects. No future projects in Missouri have been announced. TransCanada's proposed Keystone XL pipeline would connect to the existing Keystone Pipeline in Steele City, Nebraska, and increase access to Midwest markets. The project is currently awaiting decision on a Presidential Permit application. Enbridge is currently constructing the Flanagan South Pipeline Project adjacent to their Spearhead pipeline to provide more efficient transportation of oil from western Canada and North Dakota to refinery hubs in the Midwest and Gulf Coast. The Flanagan South line is planned to be in service by the end of 2014.

¹⁹ http://primis.phmsa.dot.gov/comm/reports/safety/MO_detail1.html

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Table A-21: Major Missouri Pipelines-Locations and Operators

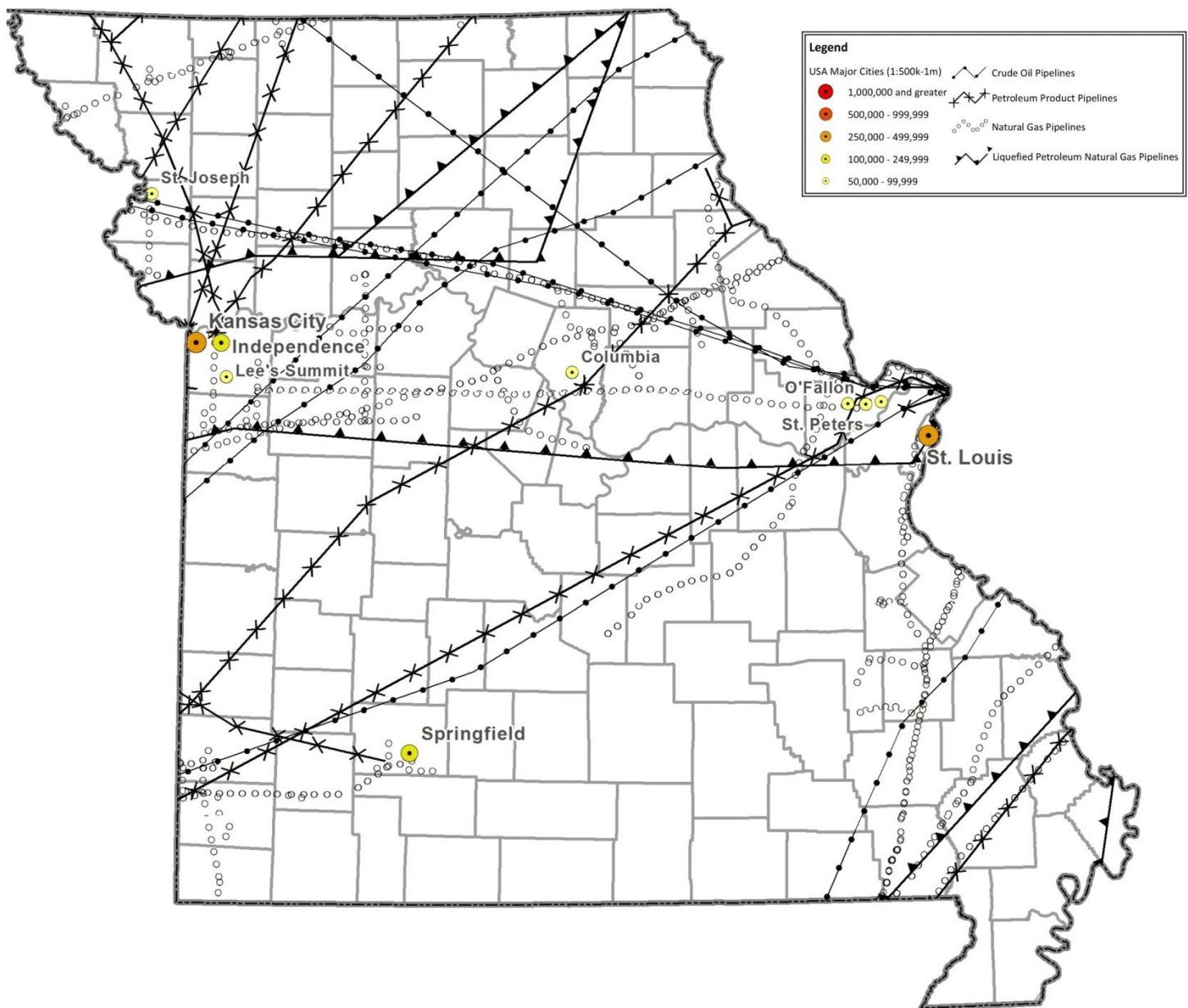
Major Pipelines in Missouri			
Crude Oil	Operator	Pipeline Name	Missouri Extents (approx.)
	Koch Pipeline	MinnCan	Bethany to Wood River, IL
	ExxonMobil	Pegasus	Doniphan to Perryville
	Enbridge	Ozark	Joplin to St. Louis
	Enbridge	Spearhead	Drexel to Palmyra
	BP Pipelines	Cushing to Whiting	Drexel to Kahoka
	Spectra Energy	Platte	St. Joseph to Wood River, IL
Petroleum Product	TransCanada	Keystone	St. Joseph to Wood River, IL
	Enterprise	TeppCo	Campbell to Cape Girardeau
	Explorer Pipeline	Houston to Wood River	Joplin to Wood River, IL
	Midstream Partners	Magellan	Lamar to Springfield
	Midstream Partners	Magellan	Lamar to Hannibal
	Midstream Partners	Magellan	St. Joseph to Albany
	Midstream Partners	Magellan	Kansas City to Bethany
Liquefied Petroleum Natural Gas	Buckeye Partners	Buckeye	Tarkio to Kansas City to Unionville
	Enterprise Products	TeppCo	Doniphan to Cape Girardeau
	Enterprise Products	Centennial	New Madrid to Charleston
	Enterprise Products	East Leg	Platte City to Memphis
Natural Gas	Conoco Phillips	Blue Line	Drexel to Wood River, IL
	Panhandle Energy	Panhandle East	Drexel to Louisiana
	Tallgrass	Rockies Express (REX)	St. Joseph to Louisiana
	TransCanada	ANR Pipeline	Mound City to Bethany
	Southern Star Central Gas	–	Drexel to St. Peters
	MoGas Pipeline	–	Waynesville to St. Louis to Bowling Green
	Enable Midstream Partners	Mississippi River Transmission	Doniphan to Farmington/St. Louis
	KinderMorgan	Natural Gas Pipeline Co. of America	Doniphan to Jackson
	Spectra Energy	Texas Eastern Transmission	Campbell to Cape Girardeau

Source: <http://www.eia.gov/state/?sid=MO> and <http://www.eia.gov/state/data.cfm?sid=MO#DistributionMarketing>

Accessed on February 5, 2014

Appendix A: Assets and Freight Flow Technical Memo

Figure A-19: Major Pipelines in Missouri



Appendix A: Assets and Freight Flow Technical Memo

Intermodal Facilities

The National Transportation Atlas Data through the Bureau of Transportation Statistics identified 110 intermodal facilities located in Missouri that provide a variety of intermodal interactions. The majority of the intermodal facilities (73 percent) accommodate rail – truck commodity transfers followed by modal transfers at ports (13 percent) and airports (7 percent) as shown in **Table A-22**.

Table A-22: Number and Percent of Missouri Intermodal Facilities

Intermodal Facilities by Type		
Intermodal Type	Number of Facilities	Percent of Total Intermodal Facilities
Rail – Truck	82	71.3%
Port – Truck/Rail	18	15.7%
Air – Truck	9	7.8%
Truck - Truck	6	5.2%
Total	115	100.0%

Source: Bureau of Transportation Statistics

The majority of the intermodal activity occurs in the metropolitan areas; see **Table A-23**. The Kansas City area has 47 while St. Louis has 30 of the intermodal facilities. Springfield (six) and St. Joseph (four) also have smaller clusters of intermodal facilities. The remaining 28 intermodal facilities are dispersed throughout the State. The intermodal facilities are shown in **Figure A-20**.

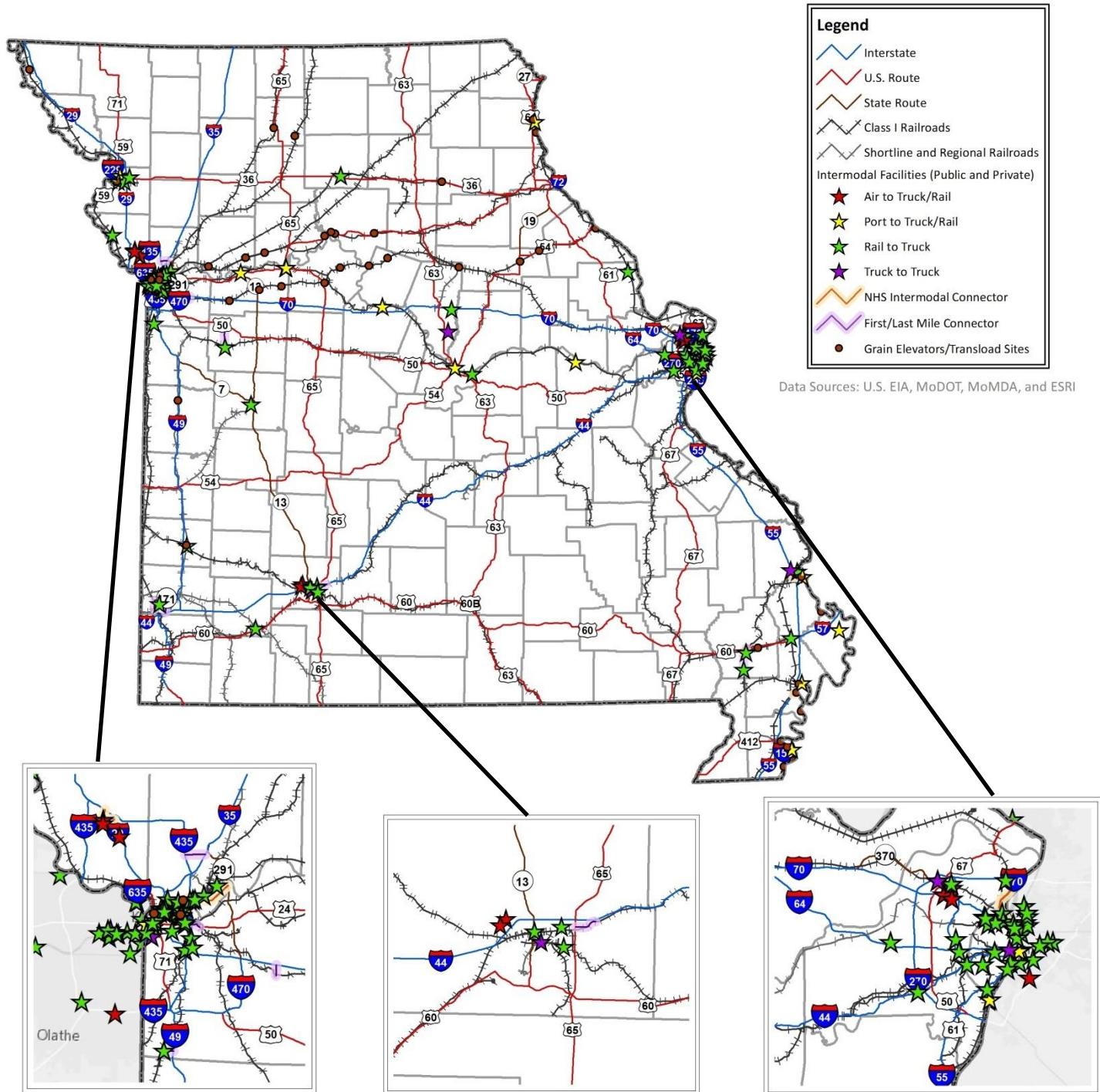
Table A-23: Missouri Intermodal Facilities by Location

Intermodal Facilities by Location		
Intermodal Facility Location	Number of Facilities	Percent of Total
Kansas City	47	40.9%
St. Louis	30	26.1%
Springfield	6	5.2%
St. Joseph	4	3.5%
Rest of State	28	24.3%
Total	115	100.0%

Source: Bureau of Transportation Statistics

Appendix A: Assets and Freight Flow Technical Memo

Figure A-20: Intermodal Facilities



Appendix A: Assets and Freight Flow Technical Memo

Freight Generators

American Transportation Research Institute (ATRI) analyzed truck Global Positioning System (GPS) data from Missouri to identify census block groups where freight activity is most intense. The output from this analysis provides insight regarding the source locations of freight movement. The ATRI *Missouri Freight Generators Analysis* is located in Attachment B.

The goal of this analysis is to identify geographic locations (at the block group level) where freight is generated. Such locations include distribution centers, warehouses, manufacturing facilities and other origins and destinations. These locations were identified based on the intensity of truck activity within block group.

To conduct the analysis, a truck GPS dataset was first assembled that included data for four months (February, May, August, and November) in 2013. The dataset was limited to points inside the boundary of Missouri; within Missouri, there were no geographic limitations.

Using a sample of this dataset, ATRI identified 400 freight-significant block groups out of a total of 4,506 in the State based on truck GPS data activity within each block group. ATRI's sample included only stopped trucks to identify 400 block groups with the greatest freight intensity. This identification allowed the research team to filter the larger statewide dataset and focus on only on data from freight generators.

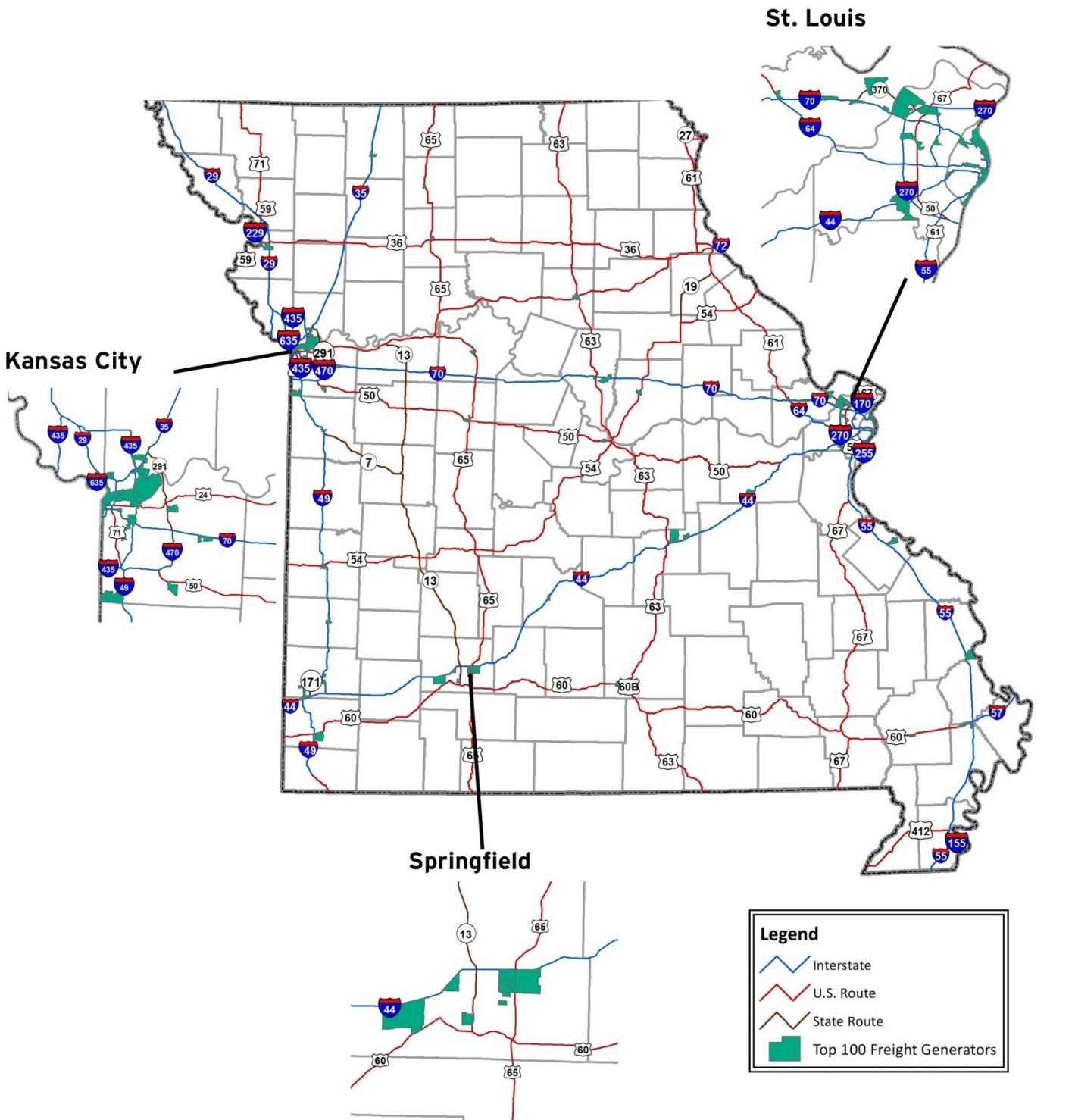
The next step was to identify the 100 most intense freight generators among the 400 block groups. To do this, a second filter was employed. Data points that fell on major roadways or at truck stops were removed from the dataset using various GIS based filters. After this process, which took advantage of available proprietary GIS layers (e.g. roadway networks), additional manual reviews were conducted using aerial imagery to identify data that fell within a block group but outside of a freight generator. The end result was a dataset that included only vehicle GPS positions within the vicinity of a freight generator facility. The process resulted in a refined truck position data set that identified, based on number of position reads, a set of 100 top freight generator block groups.

Figure A-21 depicts the 100 freight generators identified through this analysis. Each of the 100 locations is shown in orange. The analysis found that the majority of key freight generators were located along major roadways. Furthermore, urban areas such as St. Louis and Kansas City contained the highest share of generators, although several other freight generating locations were identified throughout the State. The final two figures depict the freight generator locations in greater detail for the Kansas City (**Figure A-22**) and St Louis (**Figure A-23**) metro areas. The freight generators were divided into five tiers with Tier 1 being the most active generators and Tier 5 having less activity based on the ATRI truck GPS data.

This information can be used by MoDOT, in conjunction with an analysis on truck bottlenecks, to prioritize infrastructure investments that will improve mobility in the State. In particular, this information may be valuable for identifying the investment needs of critical last-mile connectors.

Appendix A: Assets and Freight Flow Technical Memo

Figure A-21: Top 100 Identified Freight Generators: Census Block Groups

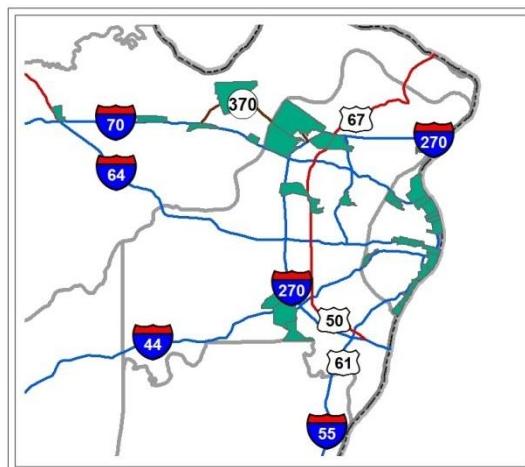


Appendix A: Assets and Freight Flow Technical Memo

Figure A-22: Top 100 Freight Generator Census Blocks: Kansas City Detail



Figure A-23 Top 100 Freight Generator Census Blocks: St Louis Detail



Appendix A: Assets and Freight Flow Technical Memo

Freight System Condition and Performance

This section discusses the existing and future condition, performance, and safety of Missouri's freight system.

Condition

Highway Conditions

MoDOT began an initiative in 2004 that focused on improving major highways. MoDOT set a target of 85 percent of major highways in good condition. Since 2009 when Tracker was implemented, Missouri major highways have exceeded the State target. In 2013, the nearly 90 percent of Missouri's major highways were in good condition which includes over 91 percent of the Interstates.

With a focus on major highways, the minor road system conditions declined in the early years of that program, with 60 percent of the minor roads in good condition in 2009. Since this date the minor road conditions have trended upward to the 2013 mark of over 78 percent of the minor roads in good condition. However, this trend has not continued and conditions have trended downward since 2013.

Highway Restrictions

Truck traffic is often restricted on highways due to low clearances at overpasses and weight restrictions on bridges. Current limits for vehicles which travel on MoDOT roadways without oversize or overweight permits reported on the MoDOT website are:

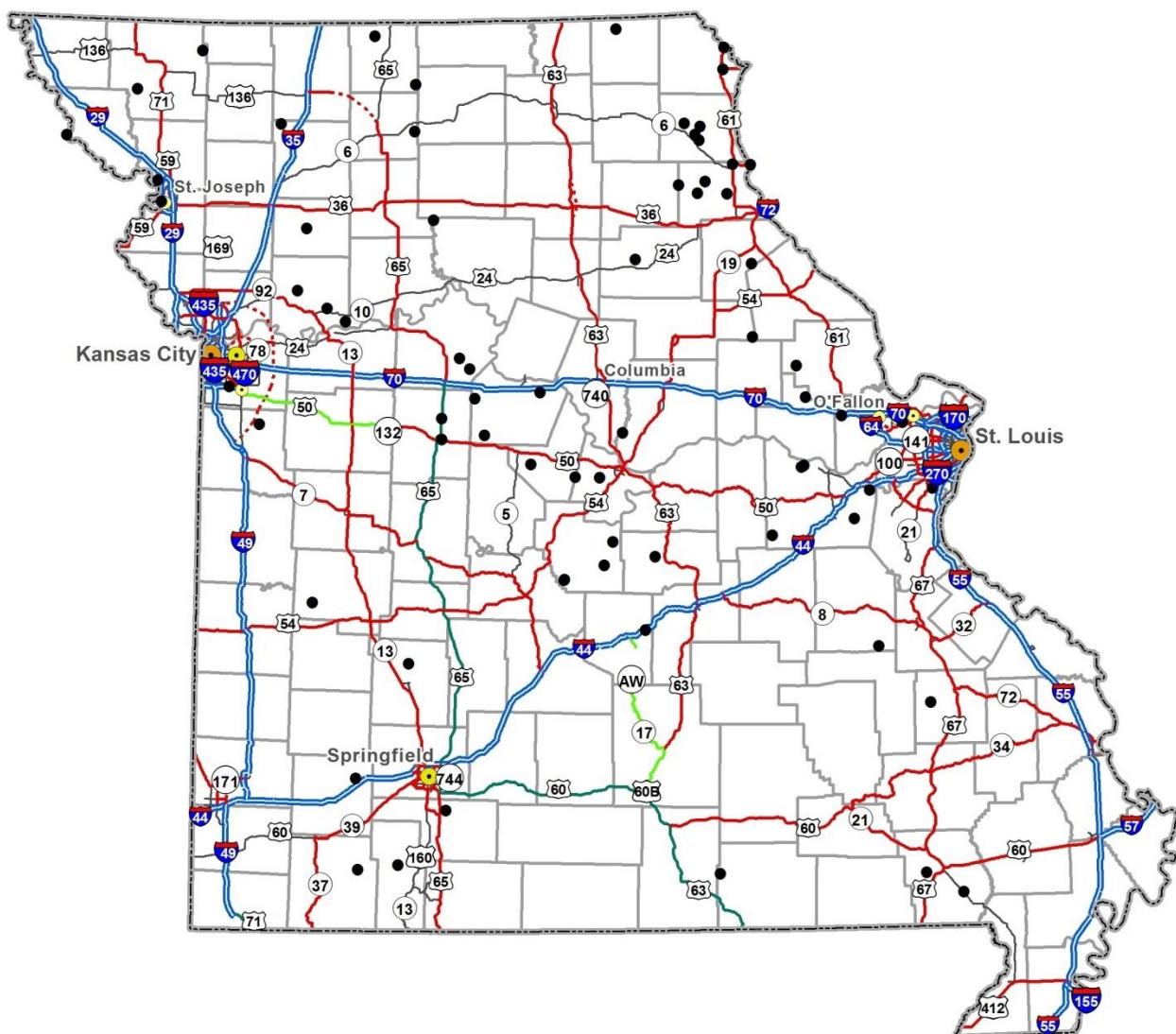
- Width – 8 feet 6 inches
- Height – 14 feet
- Gross Weight - 80,000 pounds maximum

There are a total of 73 low vertical-clearance bridges in Missouri. This represents less than one percent of all bridges in the State. None of these bridges cross interstates and four bridges (five percent) cross U.S. highways. **Figure A-24** shows the locations of these low clearance bridges.

In addition to the low clearance bridges there are 4,849 load-restricted bridges in Missouri. This is about 20 percent of all bridges in the State. One hundred and thirty-five (three percent) of these bridges cross interstates and 81 (two percent) cross U.S. highways. **Figure A-25** shows the locations of these load-restricted bridges. Forty-four of these load-restricted bridges are also low clearance bridges.

Appendix A: Assets and Freight Flow Technical Memo

Figure A-24: Low Clearance Bridges in Missouri



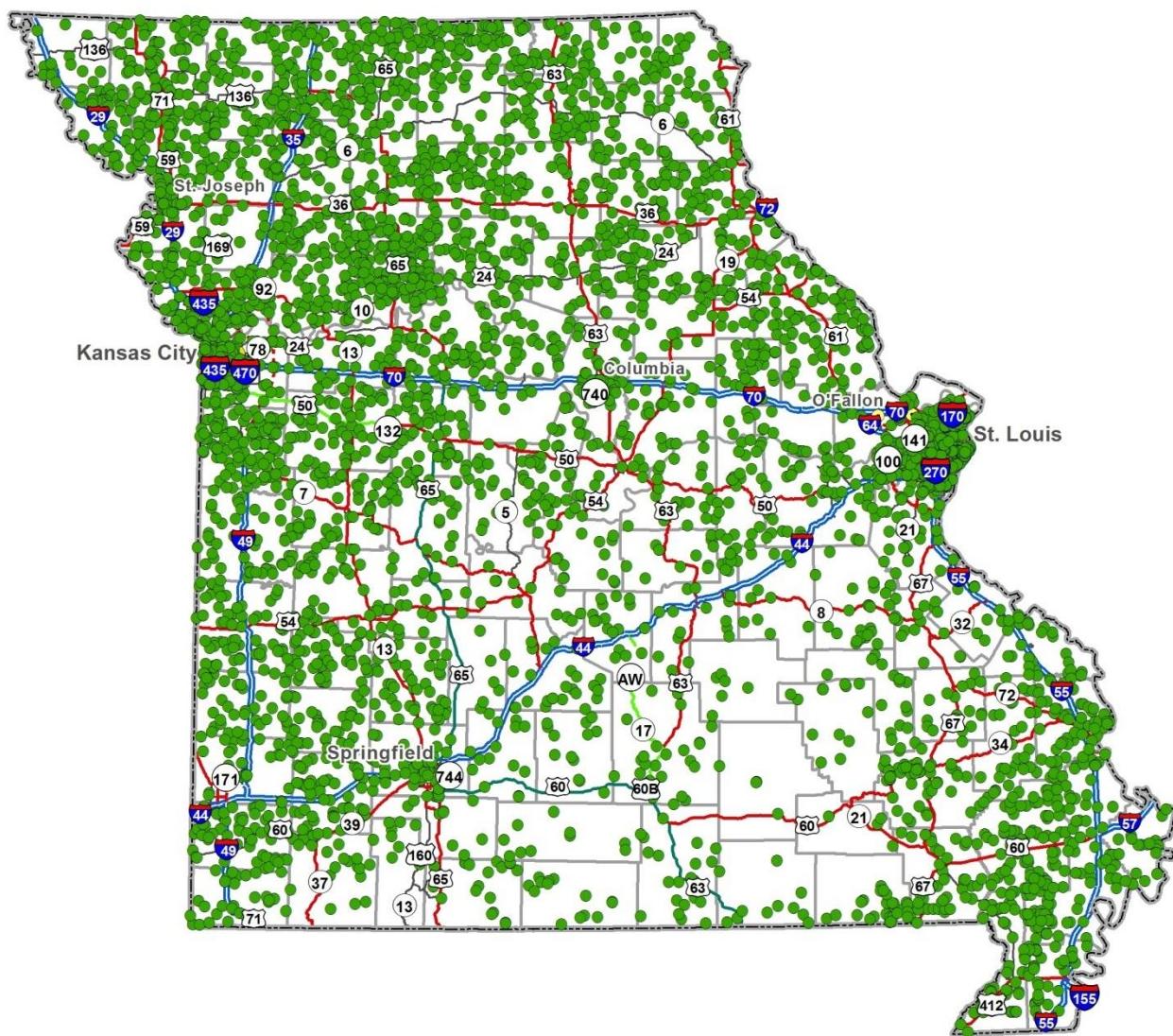
Legend

USA Major Cities (1:500k-1m)	Eisenhower Interstate System	Unbuilt NHS Routes
● 1,000,000 and greater	— Other NHS Routes	— MAP-21 Principal Arterials
● 500,000 - 999,999	— Non-Interstate STRAHNET Route	● Bridge
● 250,000 - 499,999	— Major STRAHNET Connector	
● 100,000 - 249,999	— Intermodal Connector	
● 50,000 - 99,999	— Intermodal/STRAHNET Connector	

Data Sources: USDOT BTS, USDOT FHWA, MoDOT, and ESRI

Appendix A: Assets and Freight Flow Technical Memo

Figure A-25: Load-Restricted Bridges in Missouri



Legend

USA Major Cities (1:500k-1m)	Eisenhower Interstate System	Unbuilt NHS Routes
1,000,000 and greater	Other NHS Routes	MAP-21 Principal Arterials
500,000 - 999,999	Non-Interstate STRAHNET Route	Load Restricted Bridges
250,000 - 499,999	Major STRAHNET Connector	
100,000 - 249,999	Intermodal Connector	
50,000 - 99,999	Intermodal/STRAHNET Connector	

Data Sources: USDOT BTS, USDOT FHWA, MoDOT, and ESRI

Appendix A: Assets and Freight Flow Technical Memo

Waterway Characteristics/Operations

Waterways are the original Missouri transportation system. This resource led to wealth and development that then spread outward from Missouri's rivers. A "standard" tow is 15 barges with a capacity of 22,500 tons or 45 million pounds. "Large" tows on the Mississippi below St. Louis can be as large as 40 barges. It would take two 100 railroad cars or 870 semi-trucks to carry the same amount of cargo as a standard tow. Unlike trucks, tows can carry a lot of cargo with relatively few crewmembers. Additionally, waterways are inherently grade-separated from highways and railways; thus, they do not cause congestion in other modes. When waterborne cargo is used instead of trucking, it saves fuel and improves highway conditions including safety, reduced congestion, pavement life and reduced emissions. Reducing fuel and labor costs reduces transportation costs, improving profits commercially and agriculturally.

Waterways are comparable in capacity and importance to interstate highways. Annual cargo through Missouri's ports is worth billions of dollars. Assets of public ports are comparable to industrial parks.

Performance

Truck Bottlenecks

The Freight Performance Measures (FPM) database compiles anonymous trucking operations data from several hundred thousand trucks using GPS data from onboard trucking systems – generating billions of data points annually. Each truck used in FPM analysis has a regular position read (generally every 1 to 15 minutes) and includes information on vehicle location, unique vehicle identification, time/date, and, in many cases, vehicle spot speed (which is obtained from the vehicle's engine). Through these attributes, ATRI performs spatial queries and relates the FPM truck GPS data to a variety of transportation datasets using customized software and proprietary database management workflows.

The truck GPS data from February, May, August, and November of 2013 was aggregated, generating an average speed and a count of position reads (i.e. sample size) for each hour of the day across all 3,311 segments. Average hourly speeds were aggregated into four time periods to produce a statewide speed profile by time of day:

- Morning Peak (6:00 to 9:59 a.m.)
- Midday (10:00 a.m. to 2:59 p.m.)
- Evening Peak (3:00 p.m. to 6:59 p.m.)
- Off-peak (7:00 p.m. to 5:59 a.m.)

The difference in travel time for each period compared to the off-peak travel time was multiplied by the per-mile size of the sample for that period and the values for the three periods were added together to generate the total congestion index. The 100 segments with the highest congestion indices were isolated for further analysis as the top trucking bottlenecks in Missouri. The following sections present the results of the statewide speed profile and the analysis of the top 100 truck bottleneck locations. The average speed by time of day was the primary input to the bottleneck analysis. However, it was also necessary to utilize an indicator of volume in the bottleneck analysis to ensure that roads with

Appendix A: Assets and Freight Flow Technical Memo

moderate to heavy truck volume were more heavily weighted in the bottleneck analysis than roads with little to no truck traffic. The Missouri Congestion Analysis performed by ATRI is in Attachment C.

ATRI generated a congestion index for each network segment. The 100 segments with the highest congestion index were isolated for additional analysis as the most severe truck bottlenecks in Missouri.

Figure A-26 presents the 100 segments identified as bottlenecks through this analysis. St. Louis and Kansas City contained 81 out of the state's 100 worst truck bottlenecks; however, Springfield also contained several bottlenecks, as did other cities and towns across the State.

Figure A-27 provides a more detailed view of the St. Louis area, which contained 59 out of 100 bottlenecks. The most severe bottlenecks appear to be concentrated near the confluence of Interstates 70, 64, 55, and 44 near downtown St. Louis. Other problem areas include I-270 on the west side between I-64 and I-44 and again on the north side near I-170. I-70 was also problematic west of I-270 and again west of MO-370. Additionally, segments of I-64 west of I-270 made the bottleneck list. Several arterials also experienced a high level of delay, including Kingshighway Boulevard, Grand Boulevard, Arsenal Street, MO-115, and MO -180.

Figure A-28 highlights the 22 bottlenecks identified in the Kansas City area. The analysis revealed two primary bottleneck clusters and several other isolated bottlenecks. The complex intersection with I-70, I-670, I-35, and MO-9 generated a truck bottleneck along all of those routes near downtown Kansas City. Additionally, Front Street and the Chouteau Freeway, which are located near a major rail facility, were among the worst bottlenecks in the State. Beyond those two bottleneck clusters, other problem areas include I-70 east of I-435, I-435 west of I-470, I-35 north of MO-291, US-71 between 75th Street and 55th Street, and 23rd Street between I-70 and I-435.

Figure A-29 illustrates the seven bottlenecks identified in the Springfield area. The most severe bottleneck in the area was located on MO-744 (E. Kearney Street) between US-65 and N. Glenstone Avenue. A small portion of US-160 south of I-44 also ranked highly on ATRI's analysis. Other bottlenecks include portions of MO-13, the Chestnut Expressway from MO-13 to US-65 (partially signed I-44 Business), and US-65 Business from the Chestnut Expressway to East Sunshine Street.

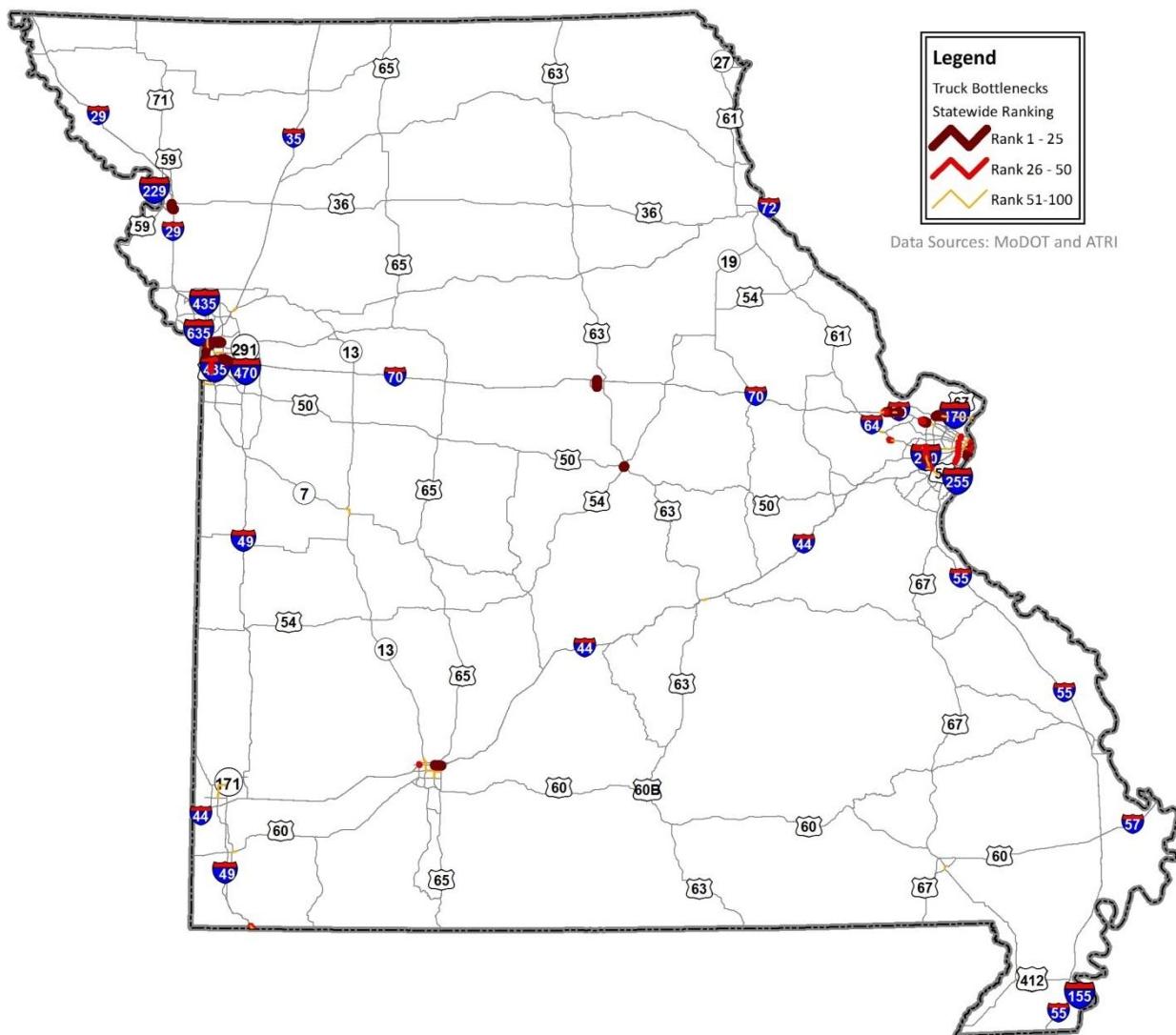
Beyond the urban areas of St. Louis, Kansas City, and Springfield, several other truck bottlenecks were identified throughout Missouri. **Figure A-30** presents the remaining bottlenecks in the state, which includes:

- US-169 between I-29 and US-36 near St. Joseph (Inset 1)
- MO-163 south of I-70 in Columbia (Inset 2)
- US-60 Business between US-54 and US-50 in Jefferson City (Inset 3)
- I-44 east of Rolla (Inset 4)
- US-67 Business in Poplar Bluff (Inset 5)
- US-60 east of I-49 near Neosho (Inset 6)
- Several segments of US-71 near the Arkansas border (Inset 6)
- Portions of I-49 Business and MO-171 near Joplin (Inset 7)
- MO-7 and MO-13 in Clinton (Inset 8)

Appendix A: Assets and Freight Flow Technical Memo

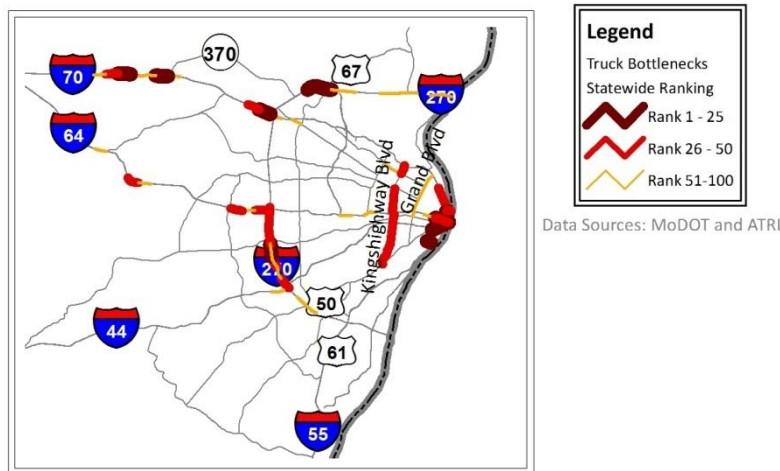
Appendix A: Assets and Freight Flow Technical Memo

Figure A-26: 100 Most Congested Trucking Bottlenecks in Missouri



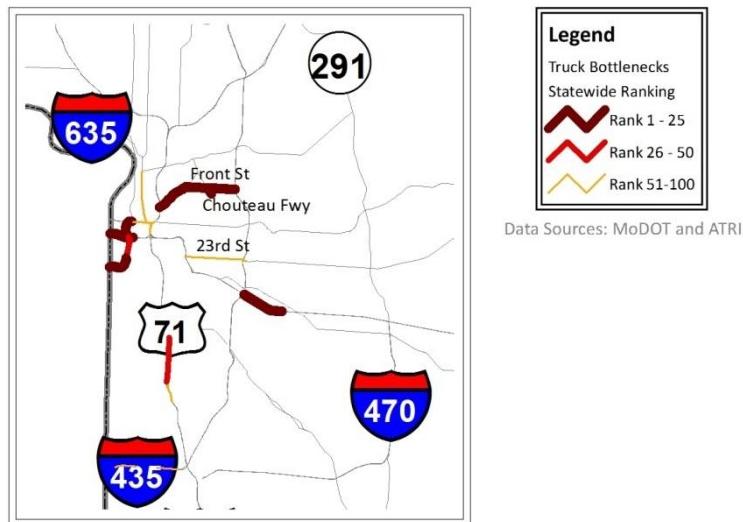
Appendix A: Assets and Freight Flow Technical Memo

Figure A-27: Most Congested Trucking Bottlenecks in St. Louis



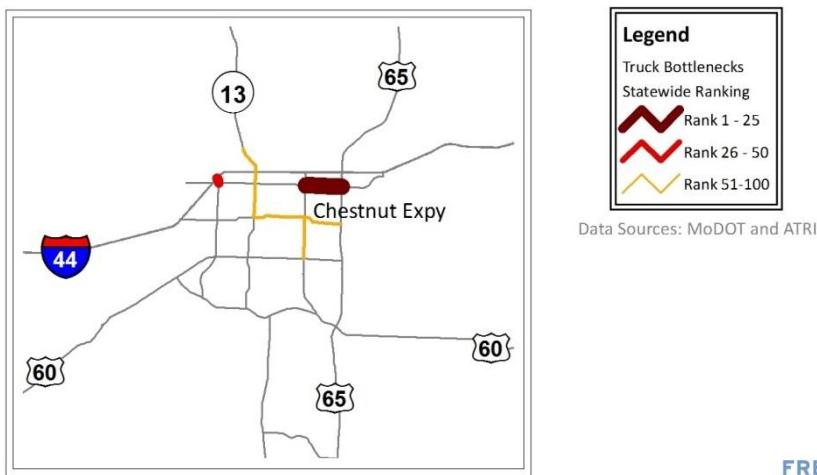
Data Sources: MoDOT and ATRI

Figure A-28: Most Congested Trucking Bottlenecks in Kansas City



Data Sources: MoDOT and ATRI

Figure A-29: Most Congested Trucking Bottlenecks in Springfield

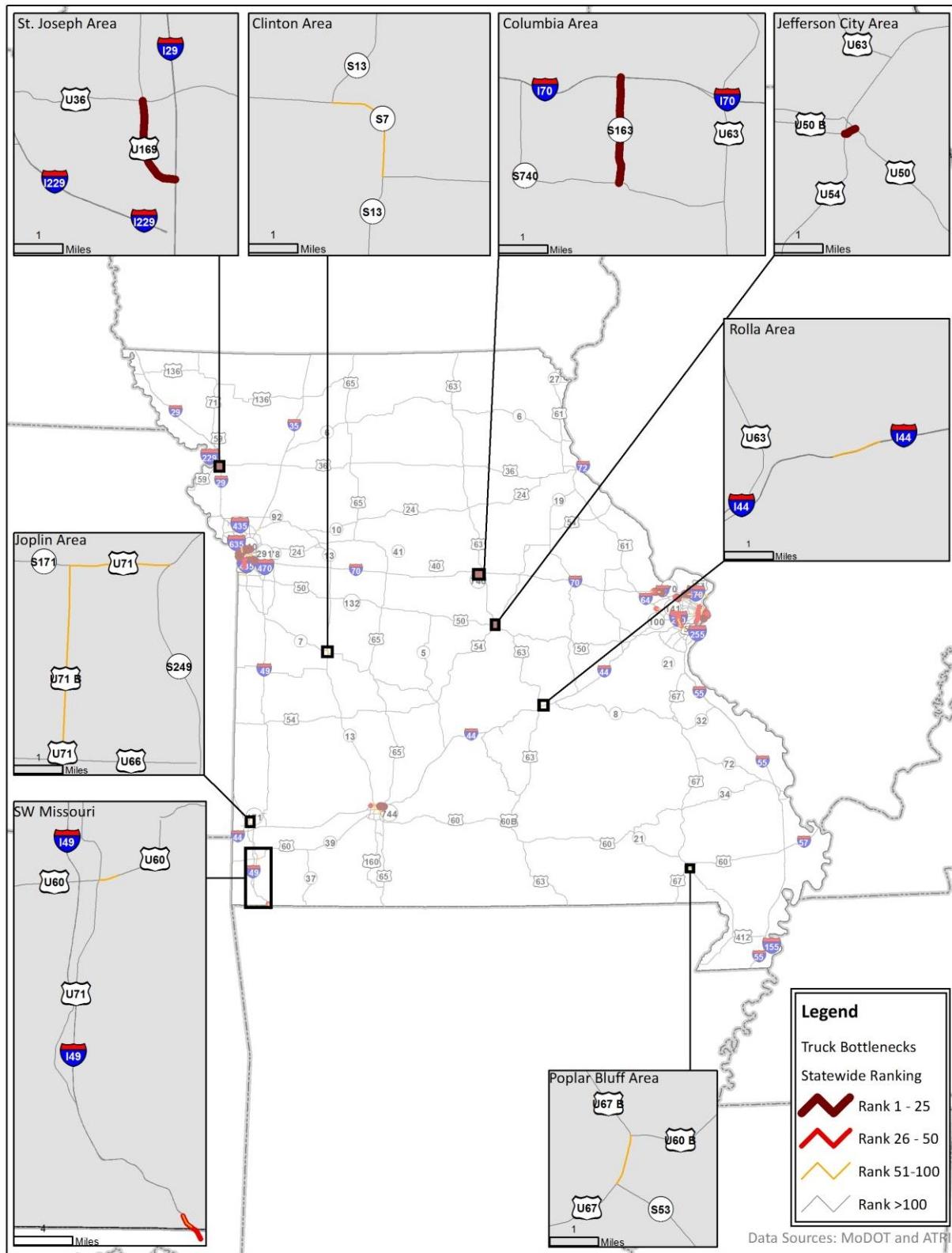


Data Sources: MoDOT and ATRI

Appendix A: Assets and Freight Flow Technical Memo

Figure A-30: Other Truck Bottleneck Locations in Missouri

Appendix A: Assets and Freight Flow Technical Memo



Rail Bottlenecks

Appendix A: Assets and Freight Flow Technical Memo

The National Rail Freight Infrastructure Capacity and Investment Study prepared by the Association of American Railroads (AAR) has developed a methodology for determining the level of service for a specific freight rail corridor. The basis for determining the level of congestion on a rail corridor is a calculated volume-to-capacity ratio. To determine the ratio, many system attributes are factored in, including: number of tracks, yard capacity, siding length, track speed, locomotive type, and terrain. Since this is a statewide, high-level study of rail capacity in Missouri, three factors - ratio number of tracks, train control system and train type - are used in determining current capacity.

The following is a summary of the 2012 level of service based on the volume to capacity (V/C) of the rail line for railroads operating in Missouri.²⁰ Some of this level of service data may have changed since 2012 due to the economy and demand of specific goods.

Volume Approaching Capacity (0.8 - 1.0)

1. MNA – Aurora Sub (from Carthage to Arkansas State line to south)
2. BNSF – Fort Scott Sub (from Springfield to Kansas State line to west)
3. BNSF – Brookfield Sub (from Kansas City to Iowa State line to northeast)
4. BNSF – Hannibal Sub (from St. Louis to Iowa State line to northeast)
5. KCS – Pittsburg Sub (from Kansas City to Kansas State line to southwest)
6. Terminal Railroad Association of St. Louis (from I-170 to Illinois State line to east)
7. UP – Sedalia Sub (from I-435 to Kansas State line to west)

Volume Exceeding Capacity (> 1.0)

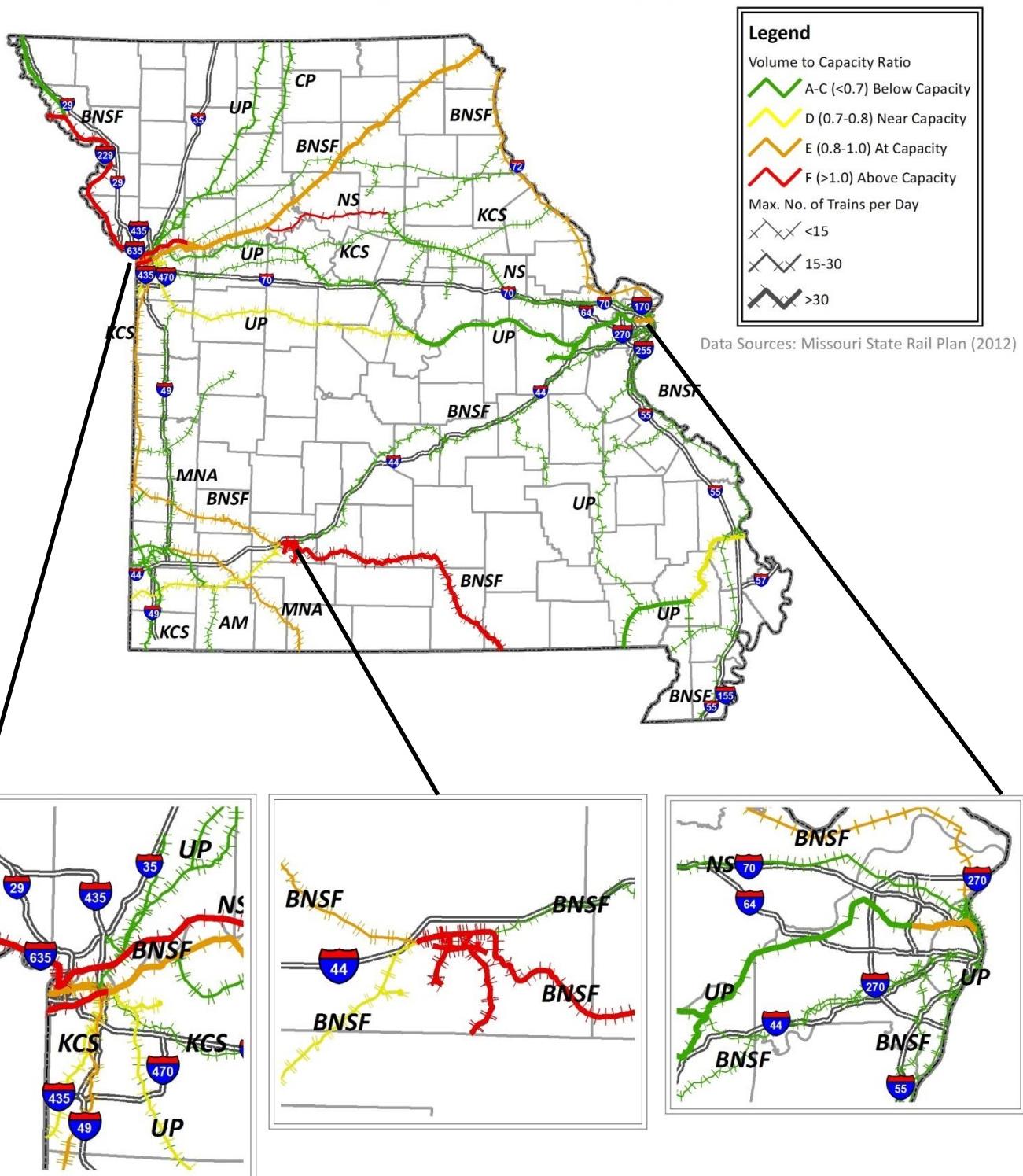
1. BNSF – Thayer North Sub (from Springfield to Arkansas State line to south)
2. BNSF – St. Joseph Sub (from Kansas City to Nebraska State line to northwest)
3. UP – Chester Sub (from Dexter to Illinois State line to east)
4. UP – Hoxie Sub (from Dexter to Arkansas State line to south)
5. UP – Sedalia Sub (from Jefferson City to Kansas City)
6. NS – Kansas City District (from Moberly to Kansas City)
7. Kansas City Terminal Railroad (from I-435 to Kansas State line to west)

The map in **Figure A-31** illustrates the volume-to-capacity ratio and the maximum number of trains per day for each freight rail corridor in Missouri. The Interstate highways are also shown for reference.

²⁰ Missouri State Rail Plan, MoDOT, 2012

Appendix A: Assets and Freight Flow Technical Memo

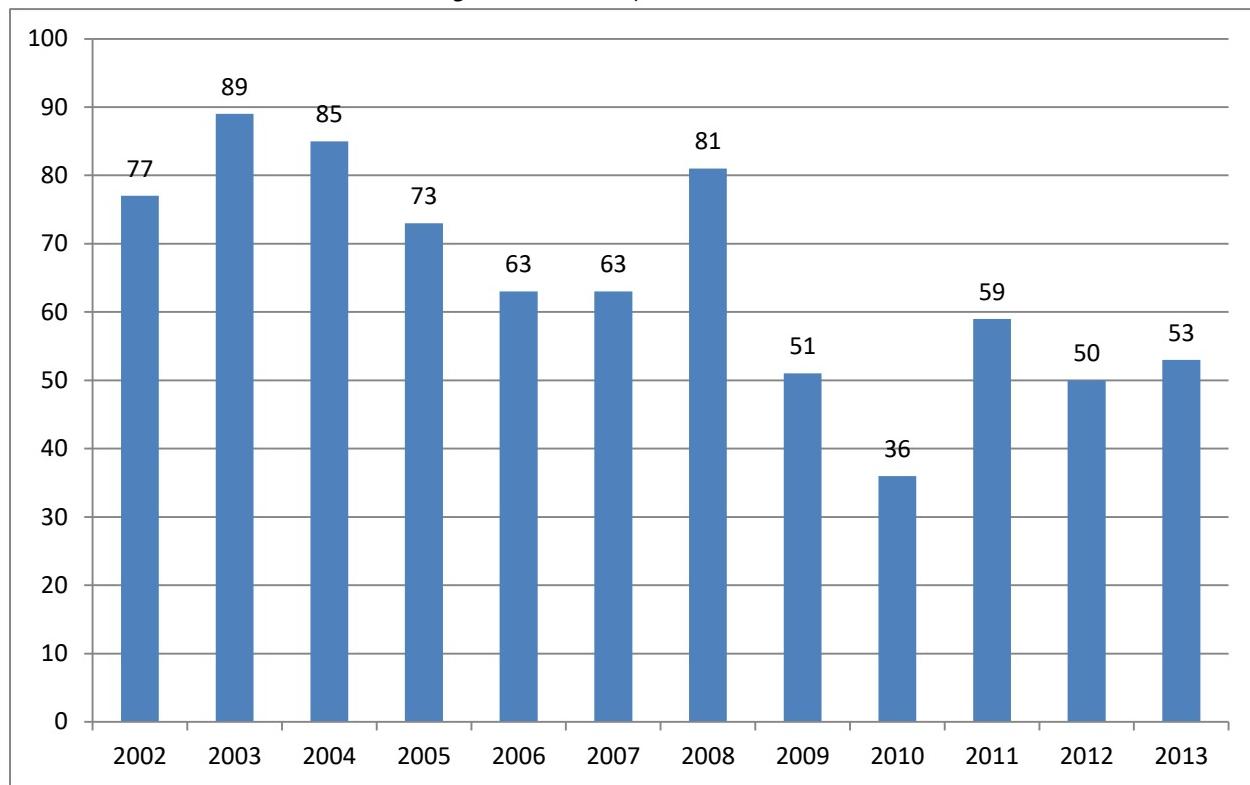
Figure A-31: Rail Corridor Volume to Capacity



Appendix A: Assets and Freight Flow Technical Memo

MoDOT and Missouri's railroad operators understand and promote the importance of railroad safety. MoDOT's website, for example, has rail safety information designed for schools, communities, commercial drivers, driver education programs, and other interested parties. Here people can learn more about railroad grade crossing hazards and safety issues, while also learning more about how to avoid becoming involved in an accident. A train accident can be defined as an event resulting in monetary damage to track and/or on-track rail equipment. This definition does not include lading, clearing costs, and environmental damage. Total accidents/incidents generally represent the sum of train accidents, highway-rail incidents, and other incidents. Other incidents include any event causing a death, an injury or an occupational illness to a railroad employee. The rail vehicle accident/incidents since 2002 are shown in **Figure A-32**.

Figure A-32: Accidents/Incidents in Missouri



Source: http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/on_the_fly_download.aspx

Waterway Issues

Three public port authorities located along the Missouri River have identified improvements of the river's navigation facilities as important. The Missouri River has a large potential to serve most of Missouri farmers. There are eight authorized purposes for the Missouri River and balancing water flow out of the dams to serve all eight has given the Missouri River a reputation for unreliable navigation over the last few years. However, as we are seeing this year, freight is again moving on the MO River as capacity issues on the rail and highway have necessitated the development of additional modes of transporting agricultural products to market.

Appendix A: Assets and Freight Flow Technical Memo

There is concern from public and private ports about restrictions to floodplain development since all ports are on riverbanks. This issue has contributed to the lack of infrastructure to handle freight. Missouri River port authorities have concerns about Missouri River cargo going through other states instead. To stay in business port authorities are primarily focused on businesses that do not depend solely on waterways.

Container-On-Vessel (COV)

Port authorities, government agencies, and shippers look to the feasibility of COV service to enhance existing truck and rail transport. COV is cost-effective for shippers when measured by unit, operation and labor costs when compared to rail and truck. Potential obstacles to greater use of COV in Missouri include: readiness of ports, delivery requirements for ports to sustain service, and inefficiencies in backhauling empty containers.

Initiation of COV service depends on the development of partnerships between key port operators and shipping stakeholders, including navigators, manufacturing, and logistics firms. According to "Missouri Public Port Authorities: Assessment of Importance and Needs" – all current port facilities, with limited capital investments, could operate as a COV facility.²¹

Safety

The three year crash rate (2010 – 2012) was calculated for highway segments proposed for the Missouri freight network based on 100 million vehicle miles traveled (HMVMT).²² The crash rates were developed bi-directionally for each segment. The segments were separated by interstates and all other routes which comprised a combination of U.S. highways and a few Missouri routes. This separation was maintained throughout the analysis since interstates generally have lower crash rates than other route designations. The interstates were divided into 55 segments resulting in 110 bi-directional segments. The U.S. highways and Missouri routes had 57 segments with 114 bi-directional segments.

After the three-year crash rates were calculated, the interstates were divided into four tiers with Tier 1 representing the highest interstate segment crash rates. The top three segments for interstates and U.S./MO routes are shown in **Table A-24**. The same process was completed for the U.S. highways and Missouri routes. The results of this analysis are shown in **Figures A-33** and **A-34**.

²¹ Missouri Public Port Authorities: Assessment of Importance and Needs, MoDOT, March 2006.

²² MoDOT 2010-2012 Crash Data, CDM Smith analysis

Appendix A: Assets and Freight Flow Technical Memo

Table A-24: Top Interstate and U.S./MO Route CMV Crash Rate Locations

Top Interstate and U.S./MO Route CMV Crash Rate Locations			
Interstate Segment	Direction	To	From
I-55	North	I-44	I-70
I-55	South	I-70	I-44
I-29	South	I-435 (north)	I-35 split
U.S./MO Route Segment	Direction	To	From
MO 13	South	I-44	US-60
MO 210	East	I-435	MO 291
MO 13	North	US-60	I-44

Source: CDM Smith

There are segments of interstates, mostly within urban areas, that are in Tier 1. Sections of I-70, I-35, I-29, and I-435 in Kansas City are in Tier 1, as are small segments of I-70, I-64, I-55, and I-270 in St. Louis and segments of I-29 and I-229 in St. Joseph. In addition to these urban areas, there is a segment of I-44 near the Oklahoma border in Tier 1.

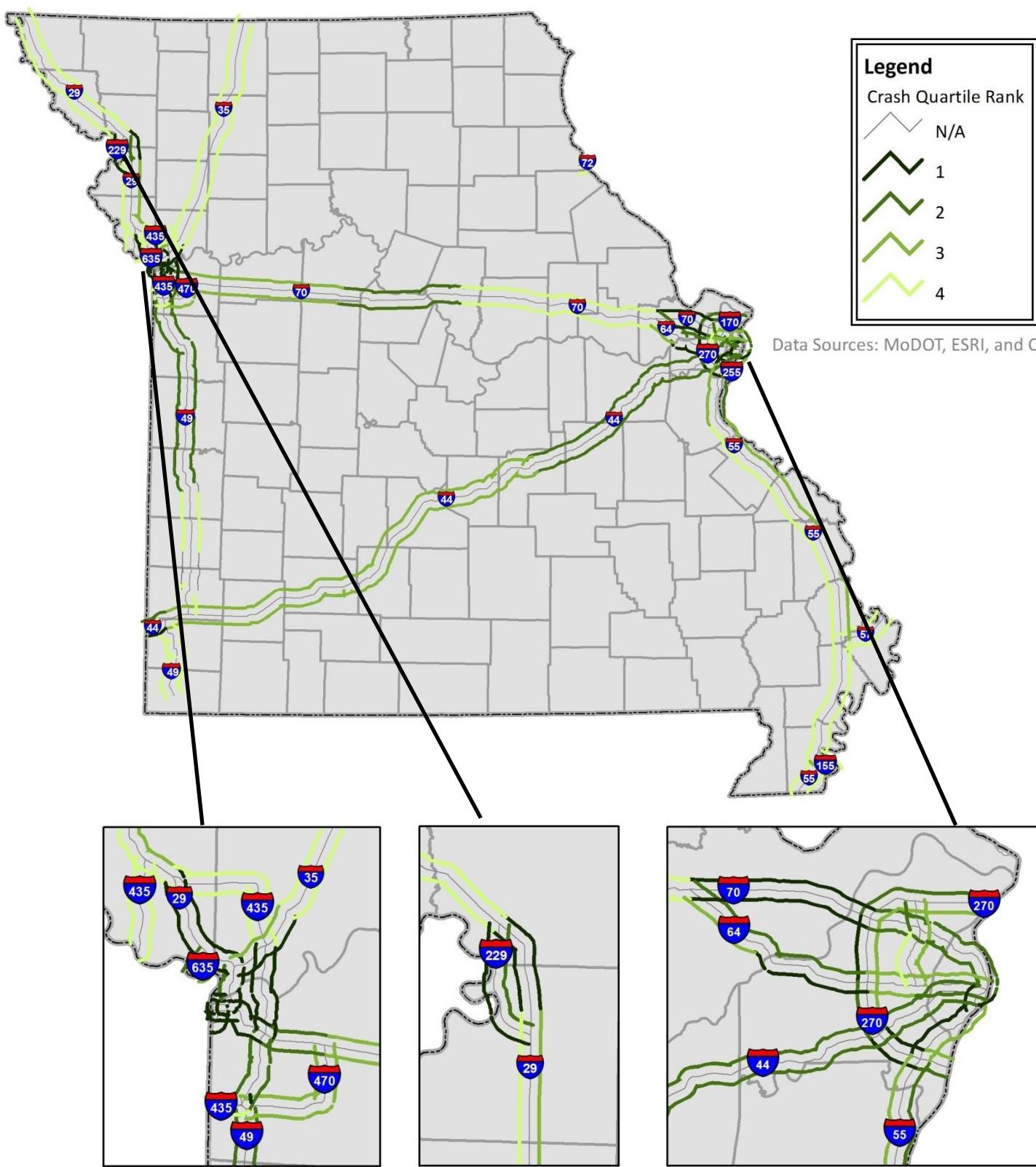
Larger segments of U.S. highways and Missouri routes are also within Tier 1 and, compared to the Interstates, are mostly outside of the urban areas.

- Southbound US-65 from Iowa border to US-54
- US-50 from US-65 to US-54
- Westbound US-50 from US-54 to I-44
- Southbound US-63 from US-50 to Arkansas border
- Eastbound US-60 from Oklahoma border to US-65
- MO 13 from US-54 to US-65

In addition, small segments of US-67 and US-50 in St. Louis and US-71 and MO-210 in Kansas City are in Tier 1.

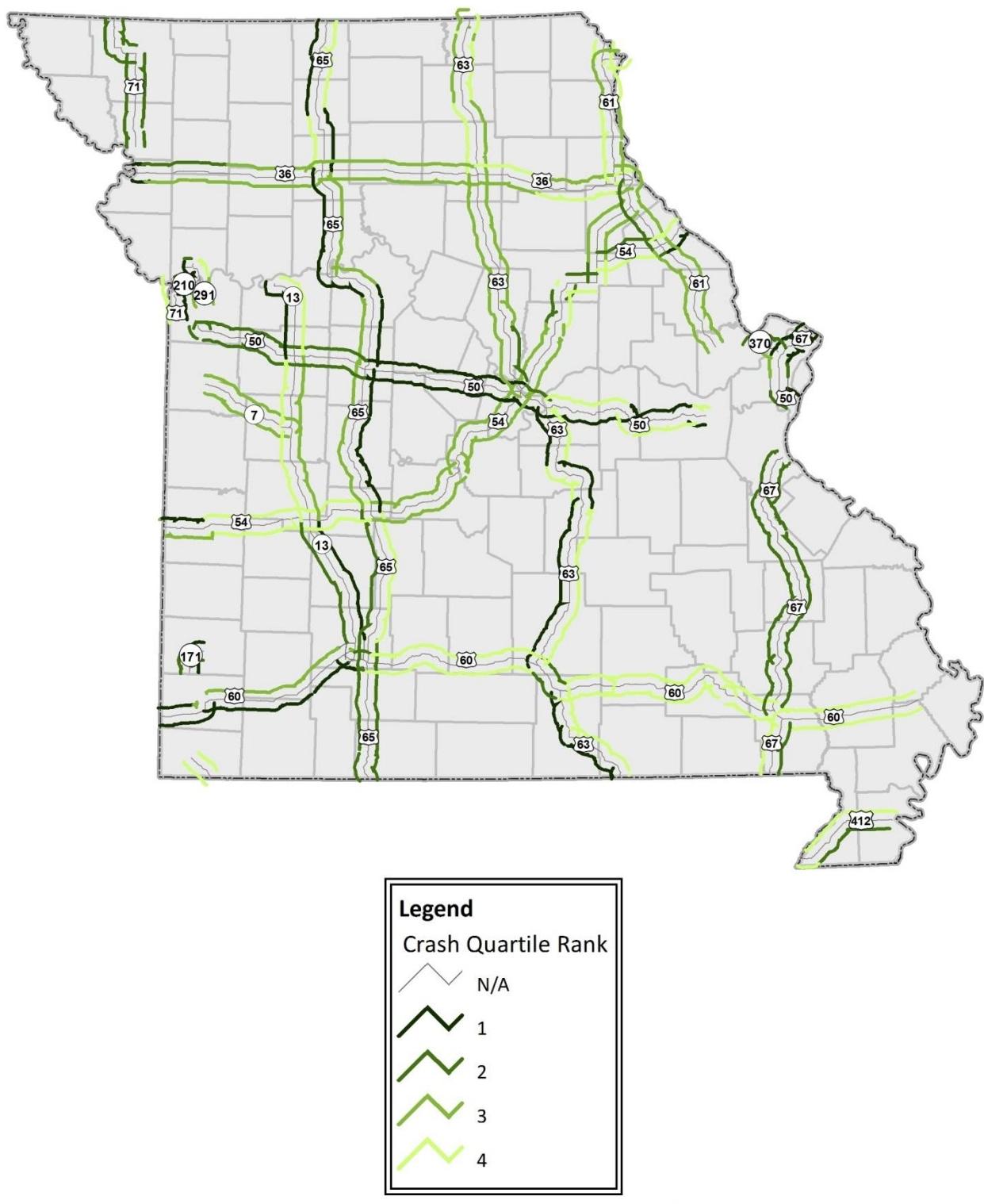
Appendix A: Assets and Freight Flow Technical Memo

Figure A-33: Crash Rates on Interstates in Missouri



Appendix A: Assets and Freight Flow Technical Memo

Figure A-34: Crash Rates on U.S. Highways and Missouri Routes



Appendix A: Assets and Freight Flow Technical Memo

Freight Flows and Forecasts

This section discusses the existing Missouri freight and commodity flows, as well as the forecasted 2030 flows. The commodity flows are discussed by mode of transportation.

A vast amount of freight traverses Missouri's infrastructure annually. Such freight includes finished goods, materials, and supplies. Central issues concerning freight are: identifying the movements most important to Missouri, and identifying options to facilitate/support them. Identifying the importance of, and solutions for, freight issues comprises several perspectives: volumes (especially compared to capacity), values, related economic impacts, and public perception. TRANSEARCH® data provides Missouri-related movements by mode, direction, and commodity, and by tonnage, units, and value.

The full TRANSEARCH report is located in Attachment D.

Freight tonnage across the Missouri freight network is forecast to grow 37.3 percent from 2011 to 2030 (1.7 percent annually), as summarized in **Table A-25**. Truck and rail are by far the dominant modes of freight transportation in Missouri. Truck movements account for 49 percent of the total tonnage and rail movements account for 45 percent. Truck growth is forecast to grow by 55.5 percent (2.4 percent annually), from 500.4 million tons in 2011 to 778.1 million in 2030, a 277.7 million ton increase. In the context of the aggregate 378.8 million ton growth forecast for all combined modes, this 277.7 million increase in truck constitutes 73.3 percent, about half of which is attributable to through movements. While rail growth is forecast to grow by 19 percent (0.9 percent annually), from 458.1 million tons in 2011 to 545.2 million tons in 2030, it still constitutes 40 percent of the total tonnage moved through Missouri.

Through movements are the dominant direction of freight movement in Missouri. They represent 59 percent of all tonnage and are forecast to exhibit the largest percentage growth (73.0 percent, or 2.9 percent annually). This is a significant increase and in perspective, through traffic is projected to increase in absolute tonnage terms (204.8 million) in excess of all the three other directions combined (174.0 million).

Appendix A: Assets and Freight Flow Technical Memo

Table 25: Tonnage Forecast by Mode and Direction, 2011 to 2030

Direction	Air	Pipe	Rail	Truck	Water	Total
2011						
Outbound	34,313	N/A	21,510,433	75,301,621	19,973,291	116,819,658
Inbound	38,249	932,258	92,326,793	89,250,507	5,093,847	187,641,654
Intra	370	N/A	2,436,087	105,627,915	4,941,503	113,005,875
Through	71	7,412,827	341,805,597	230,212,488	19,850,043	599,281,026
Total	73,003	8,345,085	458,078,910	500,392,531	49,858,684	1,016,748,213
2030						
Outbound	54,382	N/A	35,366,325	108,430,027	25,917,689	169,768,423
Inbound	84,077	993,713	90,178,404	129,095,659	5,906,771	226,258,624
Intra	726	N/A	3,237,194	182,656,763	9,565,245	195,459,929
Through	112	7,896,550	416,384,127	357,953,967	21,865,151	804,099,907
Total	139,296	8,890,264	545,166,049	778,136,417	63,254,857	1,395,586,882
Annual % Growth						
Outbound	2.5%	N/A	2.7%	1.9%	1.4%	2.0%
Inbound	4.2%	0.3%	-0.1%	2.0%	0.8%	1.0%
Intra	3.6%	N/A	1.5%	2.9%	3.5%	2.9%
Through	2.4%	0.3%	1.0%	2.4%	0.5%	1.6%
Total	3.5%	0.3%	0.9%	2.4%	1.3%	1.7%
Total % Growth						
Outbound	58.5%	N/A	64.4%	44.0%	29.8%	45.3%
Inbound	119.8%	6.6%	-2.3%	44.6%	16.0%	20.6%
Intra	96.2%	N/A	32.9%	72.9%	93.6%	73.0%
Through	56.8%	6.5%	21.8%	55.5%	10.2%	34.2%
Total	90.8%	6.5%	19.0%	55.5%	26.9%	37.3%
Tonnage Growth						
Outbound	20,068	N/A	13,855,892	33,128,407	5,944,398	52,948,764
Inbound	45,828	61,455	(2,148,389)	39,845,152	812,925	38,616,971
Intra	356	N/A	801,107	77,028,848	4,623,743	82,454,054
Through	40	483,724	74,578,530	127,741,479	2,015,108	204,818,881
Total	66,293	545,179	87,087,139	277,743,886	13,396,173	378,838,670

Source: TRANSEARCH Data, 2011

Truck Commodity Flows

Missouri truck movements in 2011 totaled 500.4 million tons, were valued at \$710.9 billion, and carried 40.6 million units (**Table A-26**). On average, total truck commodity movements are valued at \$1,421 per ton. Truck movements represent 49.2 percent of modal tonnage in Missouri and 59.0 percent of total modal value in 2011, the largest relative share.

Appendix A: Assets and Freight Flow Technical Memo

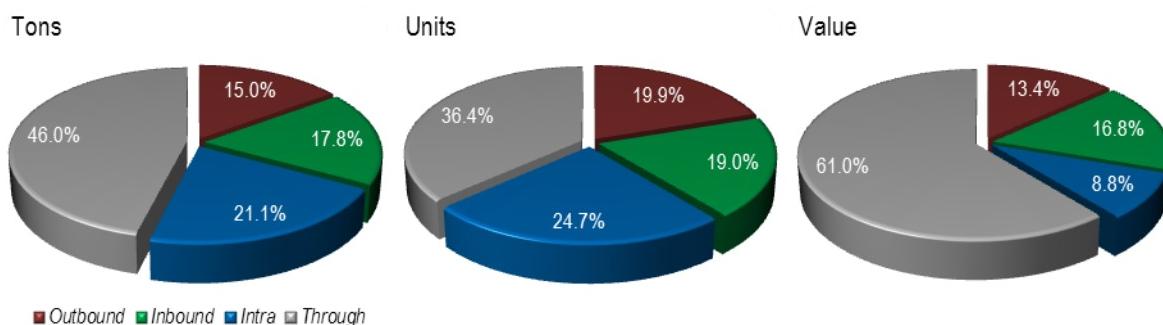
Table A-26: Truck by Direction, 2011

Direction	Tons		Units		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	Amount	Percent	
Outbound	75,301,621	15.0%	8,088,079	19.9%	\$95,005	13.4%	\$1,262
Inbound	89,250,507	17.8%	7,725,094	19.0%	\$119,731	16.8%	\$1,342
Intra	105,627,915	21.1%	10,029,099	24.7%	\$62,346	8.8%	\$590
Through	230,212,488	46.0%	14,805,680	36.4%	\$433,794	61.0%	\$1,884
Total	500,392,531	100.0%	40,647,951	100.0%	\$710,876	100.0%	\$1,421

Source: TRANSEARCH Data, 2011

As depicted in **Figure A-35**, through truck movements are the largest directional movements, comprising 46.0% of total tonnage, 36.4% of units, and 61.0% of value. Outbound, inbound, and intrastate movements comprise a remaining 270.2 million tons (54.0%), valued at \$277.1 billion (39.0%).

Figure A-35: Truck Percentages by Direction, 2011



Source: TRANSEARCH Data, 2011

The major truck freight corridors include the major interstates (I-44, I-55, I-70, I-35, and I-29), as seen in **Figure A-36**. Additionally, major U.S. and State highways in the urban centers also accommodate significant freight movements (e.g., US-61 and US-71). The top truck commodity movements by direction are identified in the respective subsections. In terms of all truck directions combined, **Table A-27** shows the top five commodities:

Appendix A: Assets and Freight Flow Technical Memo

Table A-27: Top Truck Commodities

Commodity by Tonnage	Tons (in millions)	Percent
Non-Metallic Materials	102.4	20.5%
Secondary Traffic	84.0	16.8%
Farm Products	82.2	16.4%
Food or Kindred Products	57.5	11.5%
Chemicals or Allied Products	41.8	8.4%
Commodity by Units	Units (in millions)	Percent
Shipping Containers	15.7	38.6%
Farm Products	4.9	12.1%
Secondary Traffic	4.4	10.9%
Nonmetallic Minerals	4.2	10.4%
Food or Kindred Products	2.5	6.2%
Commodity by Value	Value (in billions)	Percent
Secondary Traffic	\$161.7	22.7%
Chemicals or Allied Products	\$73.0	10.3%
Food or Kindred Products	\$71.0	10.0%
Machinery	\$53.2	7.5%
Transportation Equipment	\$50.3	7.1%

Source: TRANSEARCH Data, 2011

Appendix A: Assets and Freight Flow Technical Memo

Figure A-36: Truck Density, 2011



Appendix A: Assets and Freight Flow Technical Memo

Truck Outbound

The outbound truck commodities from Missouri, in 2011, totaled 75.3 million tons (15.0% of directional movements), via 8.1 million units (19.9%), and were valued at \$95.0 billion (13.4%), with an average value/ton of \$1,262. The top five outbound truck commodities are shown in **Table A-28**:

Table A-28: Top Outbound Truck Commodities

Commodity by Tonnage	Tons (in millions)	Percent
Farm Products	17.9	23.8%
Non-Metallic Materials	14.4	19.1%
Secondary Traffic	11.3	14.9%
Food or Kindred Products	10.5	14.0%
Chemicals or Allied Products	3.3	4.4%
Commodity by Units (in millions)	Units (in millions)	Percent
Shipping Containers	4.2	52.1%
Farm Products	1.1	13.6%
Secondary Traffic ²³	0.6	7.7%
Nonmetallic Minerals	0.6	7.3%
Food or Kindred Products	0.5	5.7%
Commodity by Value (in billions)	Value (in billions)	Percent
Secondary Traffic	\$23.1	24.3%
Food or Kindred Products	\$14.2	14.9%
Farm Products	\$9.2	9.7%
Chemicals or Allied Products	\$9.2	9.6%
Machinery	\$7.5	7.9%

Source: TRANSEARCH Data, 2011

²³ Traffic that is being delivered from a warehouse or distribution center.

Appendix A: Assets and Freight Flow Technical Memo

Outbound Tonnage Origin

The major outbound truck tonnages in 2011 are shown by county origin below. Truck movements destined out-of-state are primarily traveling from Jackson County (7.3 million, 9.8%), St. Louis County (7.1 million, 9.4%), and St. Louis City (6.1 million, 8.1%).

Jackson County:

1. Secondary Traffic (3.4 million tons, 46.4% of outbound county total)
2. Food or Kindred Products (0.9 million, 12.1%)
3. Nonmetallic Minerals (0.6 million, 8.8%)

St. Louis County:

1. Nonmetallic Minerals (3.3 million tons, 46.7% of outbound county total)
2. Food or Kindred Products (0.8 million, 11.7%)
3. Secondary Traffic (0.8 million, 10.9%)

St. Louis City:

1. Secondary Traffic (3.3 million tons, 54.9% of outbound county total)
2. Food or Kindred Products (1.0 million, 16.3%)
3. Waste or Scrap Materials (0.6 million, 9.4%)

Outbound Tonnage Destination

The major outbound truck tonnages in 2011 are shown by state. Truck movements destined out-of-state are primarily traveling to Illinois (18.1 million, 24.0%), Kansas (12.7 million, 16.8%), and Arkansas (7.2 million, 9.6%).

Illinois:

1. Nonmetallic Minerals (7.1 million tons, 39.3% of outbound state total)
2. Farm Products (5.1 million, 28.0%)
3. Secondary Traffic (1.8 million, 9.7%)

Kansas:

1. Nonmetallic Minerals (3.9 million tons, 31.0% of outbound state total)
2. Secondary Traffic (2.1 million, 16.8%)
3. Farm Products (1.7 million, 13.5%)

Arkansas:

1. Nonmetallic Minerals (2.5 million tons, 34.6% of outbound state total)
2. Farm Products (1.8 million, 24.7%)
3. Food or Kindred Products (1.0 million, 14.3%)

Appendix A: Assets and Freight Flow Technical Memo

Truck Inbound

The inbound truck commodities to Missouri in 2011 totaled 89.3 million tons (17.8% of directional movements), via 7.7 million units (19.0%), and were valued at \$119.7 billion (16.8%), with an average value/ton of \$1,342 . The top five inbound truck commodities are shown in **Table A-29**.

Table A-29: Top Inbound Truck Commodities

Commodity by Tonnage	Tons (in millions)	Percent
Farm Products	20.1	22.6%
Secondary Traffic	14.6	16.4%
Non-Metallic Materials	13.8	15.4%
Petroleum or Coal Products	10.6	11.9%
Food or Kindred Products	8.3	9.3%
Commodity by Units	Units (in millions)	Percent
Shipping Containers	3.2	41.2%
Farm Products	1.2	16.0%
Secondary Traffic	0.8	9.8%
Nonmetallic Minerals	0.6	7.3%
Petroleum or Coal Products	0.4	5.7%
Commodity by Value	Value (in billions)	Percent
Secondary Traffic	\$27.9	23.3%
Farm Products	\$11.7	9.8%
Petroleum or Coal Products	\$10.9	9.1%
Food or Kindred Products	\$10.0	8.4%
Transportation Equipment	\$9.9	8.3%

Source: TRANSEARCH Data, 2011

Inbound Tonnage Origin

The major inbound truck tonnages in 2011 are shown by state origin below. Truck movements originating out-of-state are primarily traveling from Illinois (22.1 million, 24.7%), Kansas (17.4 million, 19.5%), and Iowa (7.9 million, 8.8%).

Illinois:

1. Nonmetallic Minerals (6.8 million tons, 30.7% of inbound state total)
2. Petroleum or Coal Products (3.9 million, 17.5%)
3. Farm Products (3.8 million, 17.4%)

Appendix A: Assets and Freight Flow Technical Memo

Kansas:

1. Petroleum or Coal Products (4.6 million tons, 26.4% of inbound state total)
2. Nonmetallic Minerals (4.3 million, 24.6%)
3. Secondary Traffic (3.8 million, 21.6%)

Iowa:

1. Farm Products (4.3 million tons, 55.1% of inbound state total)
2. Nonmetallic Minerals (1.1 million, 14.2%)
3. Food or Kindred Products (0.8 million, 9.6%)

Inbound Tonnage Destination

The major inbound truck tonnages in 2011 are shown by county destination below. Truck movements originating out-of-state are primarily traveling to Jackson County (13.0 million, 14.6%), St. Louis County (11.4 million, 12.8%), and St. Louis City (9.7 million, 10.9%).

Jackson County:

1. Petroleum or Coal Products (3.2 million tons, 24.9% of inbound county total)
2. Secondary Traffic (2.9 million, 22.3%)
3. Nonmetallic Minerals (2.2 million, 16.9%)

St. Louis County:

1. Secondary Traffic (2.4 million tons, 21.2% of inbound county total)
2. Nonmetallic Minerals (1.8 million, 16.0%)
3. Petroleum or Coal Products (1.5 million, 12.7%)

St. Louis City:

1. Secondary Traffic (2.1 million tons, 21.8% of inbound county total)
2. Petroleum or Coal Products (2.0 million, 21.0%)
3. Farm Products (1.9 million, 19.8%)

Truck Intrastate

The intrastate truck commodities within Missouri in 2011 totaled 105.6 million tons (21.1% of directional movements), via 10.0 million units (24.7%), and were valued at \$62.3 billion (8.8%), with an average value/ton of \$590. **Table A-30** identifies the top five intrastate truck commodities within Missouri.

Appendix A: Assets and Freight Flow Technical Memo

Table A-30: Top Truck Commodities Within Missouri

Commodity by Tonnage	Tons (in millions)	Percent
Non-Metallic Materials	65.5	62.0%
Secondary Traffic	14.7	13.9%
Farm Products	11.5	10.8%
Clay, Concrete, Glass or Stone	4.4	4.2%
Waste or Scrap Materials	2.3	2.2%
Commodity by Units	Units (in millions)	Percent
Shipping Containers	5.2	51.5%
Non-Metallic Materials	2.7	26.9%
Secondary Traffic	0.9	8.7%
Farm Products	0.6	5.9%
Clay, Concrete, Glass or Stone	0.3	2.8%
Commodity by Value	Value (in billions)	Percent
Secondary Traffic	\$42.2	67.6%
Farm Products	\$7.6	12.2%
Food or Kindred Products	\$3.1	5.0%
Chemicals or Allied Products	\$2.1	3.4%
Petroleum or Coal Products	\$1.0	1.6%

Source: TRANSEARCH Data, 2011

Truck Through

The through truck commodities moving across Missouri in 2011 totaled 230.2 million tons (46.0% of directional movements), via 14.8 million units (36.4%), and were valued at \$433.8 billion (61.0%), with an average value/ton of \$1,884. Table A-31 displays the top five through truck commodities.

Appendix A: Assets and Freight Flow Technical Memo

Table A-31: Top Through Truck Commodities

Commodity by Tonnage	Tons (in millions)	Percent
Secondary Traffic	43.4	18.8%
Food or Kindred Products	36.5	15.9%
Chemicals or Allied Products	34.6	15.0%
Farm Products	32.7	14.2%
Petroleum or Coal Products	20.4	8.8%
Commodity by Units	Units (in millions)	Percent
Shipping Containers	3.1	21.0%
Secondary Traffic	2.2	14.8%
Farm Products	2.0	13.4%
Chemicals or Allied Products	1.7	11.5%
Food or Kindred Products	1.6	10.8%
Commodity by Value	Value (in billions)	Percent
Secondary Traffic	\$68.5	15.8%
Chemicals or Allied Products	\$55.1	12.7%
Food or Kindred Products	\$43.7	10.1%
Machinery	\$39.1	9.0%
Electrical Equipment	\$37.9	8.7%

Source: TRANSEARCH Data, 2011

Rail Commodity Flows

Missouri rail movements in 2011 totaled 458.1 million tons, were valued at \$465.0 billion, and carried 8.2 million units (**Table A-32**). On average, total rail commodity movements are valued at \$1,015/ton. Rail movements represent 45.1% of modal tonnage in Missouri and 38.6% of total modal value in 2011, the second largest relative share.

Table A-32: Rail by Direction, 2011

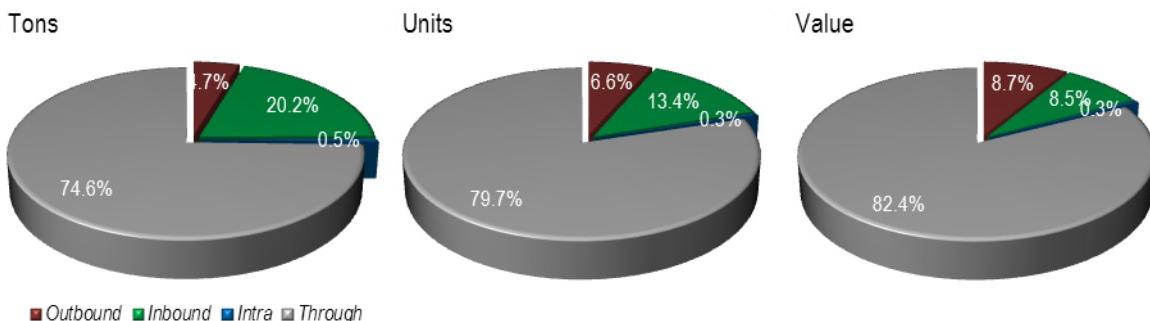
Direction	Tons		Units		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	Amount	Percent	
Outbound	21,510,433	4.7%	539,145	6.6%	\$40,364	8.7%	\$1,876
Inbound	92,326,793	20.2%	1,100,284	13.4%	\$39,647	8.5%	\$429
Intra	2,436,087	0.5%	25,780	0.3%	\$1,616	0.3%	\$663
Through	341,805,597	74.6%	6,554,377	79.7%	\$383,409	82.4%	\$1,122
Total	458,078,910	100.0%	8,219,586	100.0%	\$465,035	100.0%	\$1,015

Source: TRANSEARCH Data, 2011

Appendix A: Assets and Freight Flow Technical Memo

As depicted in **Figure A-37**, through rail movements dominate directional movements: 74.6% of total tonnage, 79.7% of units, and 82.4% of value. Outbound, inbound, and intrastate movements, combined, comprise the remaining 25.4% of tons and 17.6% of value.

Figure A-37: Rail Percentages by Direction, 2011



Source: TRANSEARCH Data, 2011

Major rail freight corridors include routes served by the major Class 1 carriers, especially surrounding Kansas City, as seen in **Figure A-38**; routes with the densest rail traffic include the Union Pacific line between Kansas City and St. Louis and the Burlington Northern-Santa Fe lines connecting Kansas City and Chicago, and between Kansas City and Wyoming (via Nebraska). The top rail commodity movements by direction are identified in the respective subsections. **Table A-33** lists the top five commodities for rail for all directions.

Appendix A: Assets and Freight Flow Technical Memo

Table A-33: Top Rail Commodities

Commodity by Tonnage	Tons (in millions)	Percent
Coal	223.9	48.9%
Food or Kindred Products	39.3	8.6%
Chemicals or Allied Products	38.2	8.3%
Miscellaneous Mixed Shipments	37.2	8.1%
Farm Products	36.2	7.9%
Commodity by Units	Units (in millions)	Percent
Miscellaneous Mixed Shipments	2.6	31.9%
Coal	1.9	22.9%
Transportation Equipment	0.7	8.4%
Food or Kindred Products	0.6	6.9%
Farm Products	0.5	6.0%
Commodity by Value	Value (in billions)	Percent
Miscellaneous Mixed Shipments	\$186.9	40.2%
Transportation Equipment	\$111.1	23.9%
Chemicals or Allied Products	\$56.9	12.2%
Food or Kindred Products	\$28.3	6.1%
Primary Metal Products	\$18.2	3.9%

Source: TRANSEARCH Data, 2011

Appendix A: Assets and Freight Flow Technical Memo

Figure A-38: Rail Density, 2011



Appendix A: Assets and Freight Flow Technical Memo

Rail Outbound

The outbound rail commodities from Missouri in 2011 totaled 21.5 million tons (4.7% of directional movements), via 539,145 units (6.6%), and were valued at \$40.4 billion (8.7%), with an average value/ton of \$1,876. **Table A-34** shows the top five outbound rail commodities from Missouri.

Table A-34: Top Outbound Rail Commodities

Commodity by Tonnage	Tons (in millions)	Percent
Food or Kindred Products	5.0	23.2%
Clay, Concrete, Glass or Stone	3.1	14.6%
Farm Products	3.1	14.2%
Miscellaneous Mixed Shipments	2.3	10.5%
Waste of Scrap Materials	2.1	9.7%
Commodity by Units (in 1,000s)	Units (in 1,000s)	Percent
Miscellaneous Mixed Shipments	173.8	32.2%
Transportation Equipment	115.2	21.4%
Food or Kindred Products	70.9	13.1%
Clay, Concrete, Glass or Stone	32.6	6.0%
Farm Products	29.8	5.5%
Commodity by Value (in billions)	Value (in billions)	Percent
Transportation Equipment	\$19.4	47.9%
Miscellaneous Mixed Shipments	\$11.2	27.7%
Chemicals or Allied Products	\$3.1	7.6%
Food or Kindred Products	\$2.8	6.9%
Primary Metal Products	\$0.7	1.8%

Source: TRANSEARCH Data, 2011

Outbound Tonnage Origin

The major outbound rail tonnages in 2011 are shown by county origin below. Rail movements destined out-of-state are primarily traveling from Jackson County (10.2 million, 47.3%), St. Louis City (3.0 million, 13.8%), and Ste. Genevieve County (1.5 million, 6.8%).

Jackson County:

1. Food or Kindred Products (3.2 million tons, 31.3% of outbound county total)
2. Miscellaneous Mixed Shipments (1.7 million, 16.7%)
3. Transportation Equipment (1.3 million, 13.2%)

St. Louis City:

1. Waste or Scrap Materials (0.9 million tons, 28.8% of outbound county total)
2. Chemicals or Allied Products (0.7 million, 22.7%)

Appendix A: Assets and Freight Flow Technical Memo

3. Miscellaneous Mixed Shipments (0.6 million, 19.0%)

Ste. Genevieve County:

1. Clay, Concrete, Glass, or Stone (1.5 million tons, 99.2% of outbound county total)
2. Chemicals or Allied Products (6,320, 0.4%)
3. Transportation Equipment (5,520, 0.4%)

Outbound Tonnage Destination

The major outbound rail tonnages in 2011 are shown by state destination below. Rail movements destined out-of-state are primarily traveling to Texas (3.9 million, 18.1%), California (2.0 million, 9.3%), and Illinois (1.4 million, 6.7%).

Texas:

1. Food or Kindred Products (1.8 million tons, 45.3% of outbound state total)
2. Farm Products (0.7 million, 18.1%)
3. Clay, Concrete, Glass, or Stone (0.6 million, 14.8%)

California:

1. Miscellaneous Mixed Shipments (0.7 million tons, 35.7% of outbound state total)
2. Transportation Equipment (0.4 million, 18.7%)
3. Food and Kindred Products (0.3 million, 13.8%)

Illinois:

1. Transportation Equipment (0.3 million tons, 21.3% of outbound state total)
2. Chemicals or Allied Products (0.3 million, 18.1%)
3. Nonmetallic Minerals (0.2 million, 15.1%)

Rail Inbound

The inbound rail commodities to Missouri in 2011 totaled 92.3 million tons (20.2% of directional movements), via 1.1 million units (13.4%), and were valued at \$39.6 billion (8.5%), with an average value/ton of \$429. The top five inbound rail commodities are shown in **Table A-35**.

Appendix A: Assets and Freight Flow Technical Memo

Table A-35: Top Inbound Rail Commodities

Commodity by Tonnage	Tons (in millions)	Percent
Coal	74.0	80.2%
Food or Kindred Products	4.0	4.4%
Farm Products	2.9	3.2%
Chemicals or Allied Products	2.9	3.1%
Transportation Equipment	1.9	2.1%
Commodity by Units (in 1,000s)	Units (in 1,000s)	Percent
Coal	619.9	56.3%
Miscellaneous Mixed Shipments	150.3	13.7%
Transportation Equipment	103.7	9.4%
Food or Kindred Products	46.1	4.2%
Shipping Containers	35.9	3.3%
Commodity by Value (in billions)	Value (in billions)	Percent
Transportation Equipment	\$16.0	40.4%
Miscellaneous Mixed Shipments	\$9.2	23.2%
Chemicals or Allied Products	\$3.6	9.0%
Coal	\$2.7	6.8%
Primary Metal Products	\$2.2	5.6%

Source: TRANSEARCH Data, 2011

Inbound Tonnage Origin

The major inbound rail tonnages in 2011 are shown by state origin below. Rail movements originating out-of-state are primarily traveling from Wyoming (74.3 million, 80.5%), Illinois (2.0 million, 2.1%), and North Dakota (1.3 million, 1.4%).

Wyoming:

1. Coal (73.7 million tons, 99.2% of inbound state total)
2. Chemicals or Allied Products (0.4 million, 0.6%)
3. Clay, Concrete, Glass, or Stone (0.2 million, 0.2%)

Illinois:

1. Food or Kindred Products (0.9 million tons, 46.9% of inbound state total)
2. Transportation Equipment (0.2 million, 11.9%)
3. Chemicals or Allied Products (0.2 million, 11.9%)

North Dakota:

1. Farm Products (1.0 million tons, 73.4% of inbound state total)
2. Food or Kindred Products (0.3 million, 24.4%)

Appendix A: Assets and Freight Flow Technical Memo

3. Chemicals or Allied Products (29,200, 2.2%)

Inbound Tonnage Destination

The major inbound rail tonnages in 2011 are shown by county destination below. Rail movements originating out-of-state are primarily traveling to Jackson County (28.4 million, 30.7%), St. Louis City (11.8 million, 12.8%), and Franklin County (11.7 million, 12.6%).

Jackson County:

1. Coal (19.3 million tons, 68.0% of inbound county total)
2. Food or Kindred Products (2.7 million, 9.4%)
3. Miscellaneous Mixed Shipments (1.4 million, 4.8%)

St. Louis City:

1. Coal (7.6 million tons, 64.4% of inbound county total)
2. Farm Products (1.5 million, 12.7%)
3. Chemicals or Allied Products (1.0 million, 8.6%)

Franklin County:

1. Coal (11.6 million tons, 99.8% of inbound county total)
2. Chemicals or Allied Products (7,840, 0.1%)
3. Pulp, Paper, or Allied Products (6,020, 0.1%)

Rail Intrastate

The intrastate rail commodities within Missouri in 2011 totaled 2.4 million tons (0.5% of directional movements), via 25,780 units (0.3%), and were valued at \$1.6 billion (0.3%), with an average value/ton of \$663. **Table A-36** shows the top five intrastate rail commodities within Missouri.

Appendix A: Assets and Freight Flow Technical Memo

Table A-36: Top Rail Commodities Within Missouri

Commodity by Tonnage	Tons (in millions)	Percent
Coal	1.2	50.2%
Clay, Concrete, Glass or Stone	0.5	21.1%
Farm Products	0.2	7.3%
Nonmetallic Minerals	0.2	7.3%
Food or Kindred Products	0.1	5.4%
Commodity by Units (in 1,000s)	Units (in 1,000s)	Percent
Coal	10.5	40.6%
Clay, Concrete, Glass or Stone	5.2	20.0%
Transportation Equipment	3.1	12.0%
Nonmetallic Minerals	2.2	8.5%
Farm Products	1.7	6.6%
Commodity by Value (in millions)	Value (in millions)	Percent
Transportation Equipment	\$1,125	69.6%
Chemicals or Allied Products	\$192	11.9%
Clay, Concrete, Glass or Stone	\$86	5.4%
Food or Kindred Products	\$80	4.9%
Coal	\$45	2.8%

Source: TRANSEARCH Data, 2011

Rail Through

The through rail commodities moving across Missouri in 2011 totaled 341.8 million tons (74.6 percent of directional movements), via 6.6 million units (79.7 percent), and were valued at \$383.4 billion (82.4 percent), with an average value/ton of \$1,122. The top five through rail commodities are shown in **Table A-37**.

Appendix A: Assets and Freight Flow Technical Memo

Table A-37: Top Through Rail Commodities

Commodity by Tonnage	Tons (in millions)	Percent
Coal	148.7	43.5%
Chemicals or Allied Products	33.3	9.7%
Miscellaneous Mixed Products	33.1	9.7%
Food or Kindred Products	30.1	8.8%
Farm Products	30.0	8.8%
Commodity by Units	Units (in millions)	Percent
Miscellaneous Mixed Products	2.3	35.0%
Coal	1.3	19.1%
Transportation Equipment	0.5	7.2%
Food or Kindred Products	0.4	6.8%
Farm Products	0.4	6.5%
Commodity by Value	Value (in billions)	Percent
Miscellaneous Mixed Products	\$166.6	43.5%
Transportation Equipment	\$74.6	19.5%
Chemicals or Allied Products	\$50.1	13.1%
Food or Kindred Products	\$23.3	6.1%
Primary Metal Products	\$15.2	4.0%

Source: TRANSEARCH Data, 2011

Waterway and Ports Commodity Flows

Missouri public port (waterborne) movements in 2011 totaled 49.9 million tons and were valued at \$12.5 billion (**Table A-38**). On average, total port commodity movements are valued at \$252/ton. Port movements represent 4.9 percent or modal tonnage in Missouri and 1.0% of total modal value in 2011, a small proportion relative to the dominant truck and rail modes. This data is reported through the public port authorities only and does not capture commodity flow from the numerous private ports in the State.

Table A-38: Port by Direction, 2011

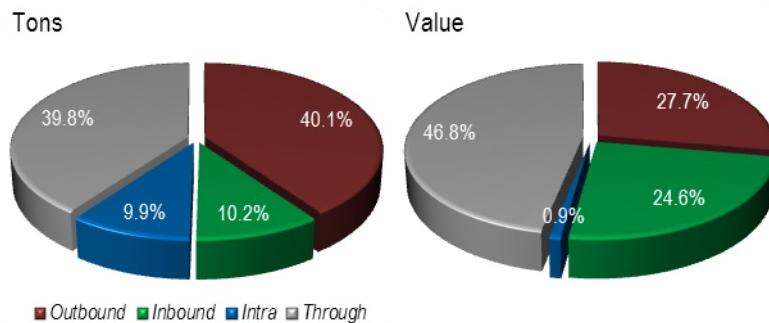
Direction	Tons		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	
Outbound	19,973,291	40.1%	\$3,479	27.7%	\$174
Inbound	5,093,847	10.2%	\$3,083	24.6%	\$605
Intra	4,941,503	9.9%	\$117	0.9%	\$24
Through	19,850,043	39.8%	\$5,870	46.8%	\$296
Total	49,858,684	100.0%	\$12,549	100.0%	\$252

Source: TRANSEARCH Data, 2011

Appendix A: Assets and Freight Flow Technical Memo

As depicted in **Figure A-39**, outbound and through tonnage directions constitute the majority of (and proportionally similar) directional movements: 40.1 percent and 39.8 percent, respectively, of total port tonnage. However, in terms of value, the through-based traffic is the relatively largest share, with outbound value not constituting similar percentages relating to tonnage because of the smaller value/ton metric for outbound port movements relative to through port movements. Intrastate port movements are relatively insignificant, but inbound comprises about a quarter of all value, despite a small tonnage percentage (due to relative high value/ton). Unlike truck and rail, unit information was not available for the ports.

Figure A-39: Port Percentages by Direction, 2011



Source: TRANSEARCH Data, 2011

Table A-39 identifies the top five port commodities for all port directions combined.

Table A-39: Top Port Commodities

Commodity by Tonnage	Tons (In millions)	Percent
Coal	12.6	25.3%
Farm Products	10.8	21.7%
Nonmetallic Minerals	8.8	17.6%
Chemicals or Allied Products	4.6	9.2%
Clay, Concrete, Glass or Stone	4.3	8.6%
Commodity by Value	Value (in billions)	Percent
Chemicals or Allied Products	\$3.5	27.8%
Petroleum or Coal Products	\$3.0	24.2%
Farm Products	\$2.1	17.1%
Crude Petroleum or Natural Gas	\$0.7	5.6%
Food or Kindred Products	\$0.6	4.5%

Source: TRANSEARCH Data, 2011

Appendix A: Assets and Freight Flow Technical Memo

Port Outbound

The outbound port commodities from Missouri in 2011 totaled 20.0 million tons (40.1% of directional movements), were valued at \$3.5 billion (27.7%), and had an average value/ton of \$174. The top five outbound port commodities are included in **Table A-40**.

Table A-40: Top Outbound Port Commodities

Commodity by Tonnage	Tons (in millions)	Percent
Coal	6.9	34.7%
Farm Products	4.9	24.6%
Clay, Concrete, Glass or Stone	3.4	16.8%
Nonmetallic Minerals	2.5	12.7%
Chemicals or Allied Products	0.9	4.3%
Commodity by Value (in millions)	Value (in millions)	Percent
Chemicals or Allied Products	\$976	28.1%
Farm Products	\$960	27.6%
Clay, Concrete, Glass or Stone	\$458	13.2%
Metallic Ores	\$446	12.8%
Coal	\$253	7.3%

Source: TRANSEARCH Data, 2011

Port Inbound

The inbound port commodities to Missouri in 2011 totaled 5.1 million tons (10.2% of directional movements), and were valued at \$3.1 billion (24.6%), with an average value/ton of \$605. **Table A-41** shows the top five inbound port commodities to Missouri

Table A-41: Top Inbound Port Commodities

Commodity by Tonnage	Tons (in millions)	Percent
Chemicals or Allied Products	1.7	33.6%
Petroleum or Coal Products	1.7	32.7%
Nonmetallic Minerals	0.7	13.3%
Metallic Ores	0.5	10.3%
Farm Products	0.2	4.3%
Commodity by Value (in millions)	Value (in millions)	Percent
Petroleum or Coal Products	\$1,531	49.7%
Chemicals or Allied Products	\$1,192	35.4%
Primary Metal Products	\$164	5.3%
Fabricated Metal Products	\$105	3.4%
Machinery	\$60	2.0%

Appendix A: Assets and Freight Flow Technical Memo

Source: TRANSEARCH Data, 2011

Port Intrastate

The intrastate port commodities within Missouri in 2011 totaled 4.9 million tons (9.9% of directional movements), were valued at \$117 million (0.9%), and had an average value/ton of \$24. The top five intrastate port commodities are displayed in **Table A-42**.

Table A-42: Top Port Commodities Within Missouri

Commodity by Tonnage	Tons (In 1,000s)	Percent
Nonmetallic Minerals	4,261.7	86.2%
Clay, Concrete, Glass or Stone	606.9	12.3%
Chemicals or Allied Products	34.1	0.7%
Petroleum or Coal Products	18.8	0.4%
Farm Products	17.8	0.4%
Commodity by Value	Value (in millions)	Percent
Clay, Concrete, Glass or Stone	\$59	50.0%
Nonmetallic Minerals	\$33	28.4%
Chemicals or Allied Products	\$16	13.9%
Farm Products	\$5	4.2%
Primary Metal Products	\$2	2.0%

Source: TRANSEARCH Data, 2011

Port Through

The through port commodities moving across Missouri in 2011 totaled 19.9 million tons (39.8% of directional movements), were valued at \$5.9 billion (46.8%), and had an average value/ton of \$296. **Table A-43** shows the top five through port commodities moving across Missouri.

Table A-43: Top Through Port Commodities

Commodity by Tonnage	Tons (in millions)	Percent
Coal	5.7	28.7%
Farm Products	5.7	28.7%
Petroleum or Coal Products	2.4	12.0%
Chemicals or Allied Products	2.0	10.1%
Nonmetallic Minerals	1.3	6.4%
Commodity by Value	Value (in billions)	Percent
Petroleum or Coal Products	\$1.5	25.3%
Chemicals or Allied Products	\$1.4	23.8%
Farm Products	\$1.1	19.0%
Crude Petroleum or Natural Gas	\$0.6	10.8%

Appendix A: Assets and Freight Flow Technical Memo

Food or Kindred Products	\$0.4	6.9%
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Source: TRANSEARCH Data, 2011

Appendix A: Assets and Freight Flow Technical Memo

Air Commodity Flows

Missouri air movements in 2011 totaled 73,003 tons, and were valued at \$11.4 billion (**Table A-44**). On average, total port commodity movements are valued at \$155,974/ton. Air movements represent less than 0.01% of modal tonnage in Missouri and less than 1.0% of total modal value in 2011, a very small proportion relative to other modes.

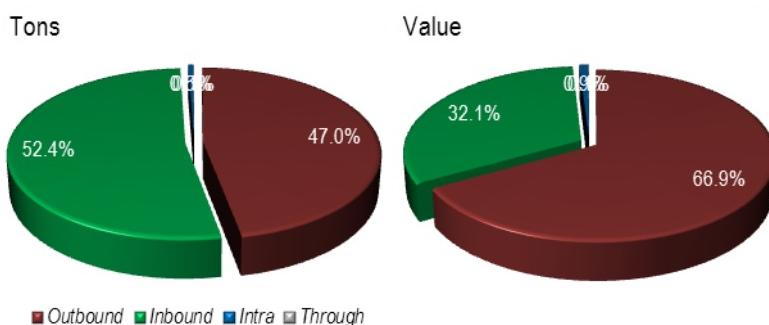
Table A-44: Air by Direction, 2011

Direction	Tons		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	
Outbound	34,313	47.0%	\$7,620	66.9%	\$222,085
Inbound	38,249	52.4%	\$3,656	32.1%	\$95,591
Intra	370	0.5%	\$100	0.9%	\$270,224
Through	71	0.1%	\$10	0.1%	\$139,152
Total	73,003	100.0%	\$11,387	100.0%	\$155,974

Source: TRANSEARCH Data, 2011

As depicted in **Figure A-40**, outbound and inbound tonnage directions constitute the gross majority (and proportionally similar) of directional movements: 47.0% and 52.4%, respectively, of total air tonnage. However, in terms of value, the outbound-based traffic is the relatively largest share, due to the relatively higher value/ton metric for outbound compared to inbound air movements (more than twice as expensive). Intrastate and through air movements are insignificant and effectively dismissible, given the combined total of only 441 tons, valued at \$110 million (as such, commodity details for such modal directions are not delineated in subsections below). Like the ports, unit information was not available for air.

Figure A-40: Air Percentages by Direction, 2011



Source: TRANSEARCH Data, 2011

Appendix A: Assets and Freight Flow Technical Memo

Table A-45 shows the top five air freight commodities.

Table A-45: Top Air Commodities

Commodity by Tonnage	Tons (in 1,000s)	Percent
Textile Mill Products	13.6	18.6%
Transportation Equipment	9.9	13.5%
Electrical Equipment	9.4	12.8%
Printed Matter	7.4	10.1%
Miscellaneous Manufacturing Products	6.7	9.1%
Commodity by Value	Value (in billions)	Percent
Miscellaneous Manufacturing Products	\$4.1	35.8%
Transportation Equipment	\$2.2	19.6%
Electrical Equipment	\$2.1	18.3%
Chemicals or Allied Products	\$1.1	9.5%
Instruments, Photo Equipment and Optical Equipment	\$0.8	7.0%

Source: TRANSEARCH Data, 2011

Appendix A: Assets and Freight Flow Technical Memo

Air Outbound

The outbound air commodities from Missouri in 2011 totaled 34,313 tons (47.0% of directional movements), and were valued at \$7.6 billion (66.9%), with an average value/ton of \$222,085. The top five outbound air commodities are included in **Table A-46**.

Table A-46: Top Outbound Air Commodities

Commodity by Tonnage	Tons (in 1,000s)	Percent
Transportation Equipment	8.0	23.4%
Miscellaneous Manufacturing Products	5.8	16.8%
Electrical Equipment	4.2	12.1%
Mail or Contract Traffic	2.8	8.1%
Textile Mill Products	2.3	6.7%
Commodity by Value	Value (in billions)	Percent
Miscellaneous Manufacturing Products	\$3.5	46.3%
Transportation Equipment	\$1.8	23.9%
Electrical Equipment	\$0.9	12.1%
Chemicals or Allied Products	\$0.6	7.8%
Instruments, Photo Equipment and Optical Equipment	\$0.3	3.6%

Source: TRANSEARCH Data, 2011

Appendix A: Assets and Freight Flow Technical Memo

Air Inbound

The inbound air commodities to Missouri in 2011 totaled 38,249 tons (52.4% of directional movements), and were valued at \$3.7 billion (32.1%), with an average value/ton of \$95,591. The top five inbound air commodities are included in **Table A-47**.

Table A-47: Top Inbound Air Commodities

Commodity by Tonnage	Tons (in 1,000s)	Percent
Textile Mill Products	11.3	29.5%
Printed Matter	5.8	15.1%
Electrical Equipment	4.9	12.8%
Mail or Contract Traffic	2.6	6.7%
Instruments, Photo Equipment and Optical Equipment	2.5	6.6%
Commodity by Value	Value (in billions)	Percent
Electrical Equipment	\$1.1	30.0%
Instruments, Photo Equipment and Optical Equipment	\$0.5	14.1%
Miscellaneous Manufacturing Products	\$0.5	14.1%
Chemicals or Allied Products	\$0.5	13.2%
Transportation Equipment	\$0.4	11.2%

Source: TRANSEARCH Data, 2011

Pipeline Commodity Flows

Missouri pipeline movements in 2011 totaled 8.3 million tons, and were valued at \$5.8 billion (**Table A-48**). On average, total pipeline commodity movements are valued at \$690/ton. Pipeline movements represent less than 1.0% of modal tonnage in Missouri and 0.5% of total modal value in 2011: the second smallest relative volume and smallest value of the presented modes.

Table A-48: Pipeline by Direction, 2011

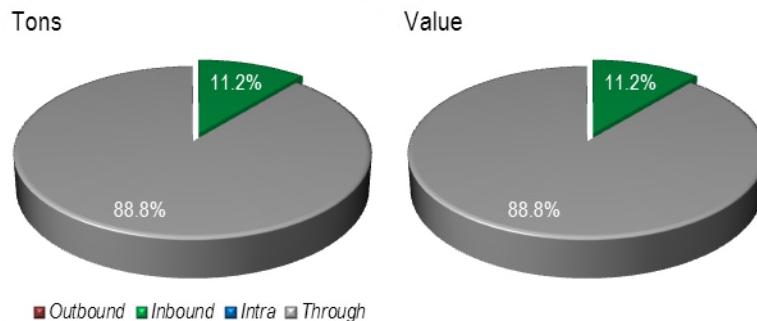
Direction	Tons		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	
Outbound	N/A	N/A	N/A	N/A	N/A
Inbound	932,258	11.2%	\$643	11.2%	\$690
Intra	N/A	N/A	N/A	N/A	N/A
Through	7,412,827	88.8%	\$5,117	88.8%	\$690
Total	8,345,085	100.0%	\$5,761	100.0%	\$690

Source: TRANSEARCH Data, 2011

Appendix A: Assets and Freight Flow Technical Memo

As depicted in **Figure A-41**, only through and inbound tonnage directions exist for pipelines in Missouri, with through constituting the significant majority for both tonnage and value (88.8% of both terms).

Figure A-41: Pipeline Percentages by Direction, 2011



Source: TRANSEARCH Data, 2011

Missouri pipeline movements comprise only two Standard Transportation Commodity Classes (STCCs) (Crude Petroleum and Natural Gas, and Petroleum or Coal Products) and two directions (inbound and through). In effect, over 99.9% of all pipeline-related movements are in the STCC: Crude Petroleum and Natural Gas, with an insignificant fraction accounting for Petroleum or Coal Products as an inbound movement. As depicted above, most of the Crude Petroleum and Natural Gas (88.8%) simply flows through Missouri.

Appendix A: Assets and Freight Flow Technical Memo

Conclusions and Next Steps

Missouri's freight system includes a wide variety of assets of varying modes, including highway, rail, air, water and pipeline as well as intermodal facilities and freight generators. The largest of these assets is Missouri's 33,700 miles of roadway. By identifying not only the critical nodes, links, and corridors of the State's freight system, but the system's current condition and performance this analysis will ultimately build the foundation for the assessment of needs of the current freight system.

Missouri is a bridge state; the TRANSEARCH® data confirms this assertion with data indicating that the majority of movements traversing Missouri's transportation network is truck- and rail-based through traffic. The main commodities are rail-based coal and truck-based secondary traffic. It is also projected that the dominance of through-based traffic will increase by 2030, reinforcing the role of Missouri as a bridge state. Of the modes, truck carries the largest relative volume and value followed by rail and then port. Pipeline carries the fourth largest relative volume followed by air; however, air carries the fourth largest by value followed by pipeline.

From a comprehensive tonnage and value perspective, the most important freight movements are through-based movements, carried by truck and rail. Thus it is important to understand the implications of these movements on the freight system in Missouri, as the users of the system are accordingly non-Missouri based. In effect, the freight system in Missouri is serving the necessary needs of others, and Missouri should keep in mind.

The ensuing economic analysis builds upon the freight data presented herein to explain and quantify the importance of freight transport to the Missouri economy. Economic impacts associated with freight go far beyond the impacts associated with freight transport service. A vast majority of freight-related economic impact is associated with the firms that use freight transport to conduct business. To understand such impact, one needs to know the value of freight movements by direction, and how the economy uses such commodities to produce goods and services.

Appendix B

Trends, Needs, and Issues

Appendix B: Trends, Needs, and Issues

Introduction

This technical memorandum explores trends and needs impacting the freight system in Missouri.

As Missouri's population and demand for goods continue to increase, the transportation of products into the state will increase. Likewise, the production of goods within the State will continue to be demanded by people in other states requiring goods to be transported out of or within Missouri. As a result, the freight transportation system (whether highway, rail, water, air and pipeline) will be expected to keep up with the increase in freight traffic. In order to do this, the freight systems will need to be maintained and potentially expanded to meet the growing demand.

All modes of freight transportation--highway, rail, air, water, and pipeline—were considered in identifying trends and issues. The discussion encompasses which freight commodities are increasing or decreasing in, out, through, and within Missouri and which mode those commodities are anticipated to use.

Information from a number of sources was gathered to identify needs and issues including: MoDOT's recently completed Long Range Transportation Plan, regional freight plans, stakeholder input, freight transportation system assets inventory and assessment, and analysis of the conditions and performance of the State's freight system.

Trends and Issues

This section identifies and explores significant trends and issues impacting the freight system in Missouri today and in the future.

Freight movement provides many economic benefits to Missouri ranging from the outbound shipment of agricultural products and the inbound shipment of manufacturing parts, to finished products shipped both into and out of the State, to consumer goods used every day by Missouri families. The economic vitality of the State relies on transportation of goods into, out of, within and to a lesser extent through Missouri to support jobs and growth.

Freight Transportation Assets

Appendix A, Assets and Freight Flow Technical Memorandum, documents the transportation assets by which freight travels within, in, out, and through Missouri. The goal of the assets inventory was to identify the freight assets utilized and projected to be utilized within Missouri, so MoDOT can verify the capabilities of their freight infrastructure. The objective of the analysis is ultimately to identify freight system needs, potential capital improvements, and policy options to maintain and improve operations of the system. The inventory is discussed based on the modes by which freight travels in Missouri, as well as intermodal facilities and freight generators. Additional information on Missouri's freight assets is located in Appendix A.

Highway

Appendix B: Trends, Needs, and Issues

Missouri has the seventh largest state highway system in the United States. It is made up of 33,700 centerline miles of roadway and over 10,000 bridges, 5,500 miles of which are classified as heavily traveled “major highways” and 28,200 miles of which are defined as lesser traveled “minor highways”. Missouri’s major highways encompass just 20 percent of the State’s highway miles but carry 80 percent of the system’s traffic.

Rail

The state of Missouri has a significant freight rail infrastructure with six Class I freight railroads currently operating 4,200 miles of main track rail lines, 2,500 yard track miles, and 5,700 public and private rail-highway crossings within the State. There are no Class II railroads operating in Missouri; however, there are five short line railroads that serve Missouri. A railroad with operating revenues greater than \$433.2 million¹ for at least three consecutive years is considered a Class I railroad. Similarly, a railroad with revenues greater than \$34.7 million², but less than \$433.2 million³, is considered a Class II railroad; such railroads are commonly referred to as “regional” railroads. A railroad not within the Class I or II categories is considered a Class III railroad, also known as a “short line.”

¹ http://www.aslrra.org/about_aslrra/faqs/

² http://www.aslrra.org/about_aslrra/faqs/

³ http://www.aslrra.org/about_aslrra/faqs/

Appendix B: Trends, Needs, and Issues

Water

Missouri contains 1,050 miles of navigable rivers, including 500 miles of the Mississippi River and 550 miles of the Missouri River. A total of 14 public ports and over 200 private ports can be found along Missouri's waterways. Three public ports and over 50 private ports operate along the Missouri River; 11 public port authorities and over 150 private ports operate on the Mississippi River.

Air

Missouri is home to three of the top 106 cargo airports in North America in terms of total tonnage in 2012; these are Kansas City International Airport (MCI), Lambert-St. Louis International Airport (STL), and Springfield-Branson National Airport (SGF).

Pipeline

Approximately 10,700 miles of pipelines move natural gas, crude oil, and petroleum products throughout Missouri.

Intermodal Facilities

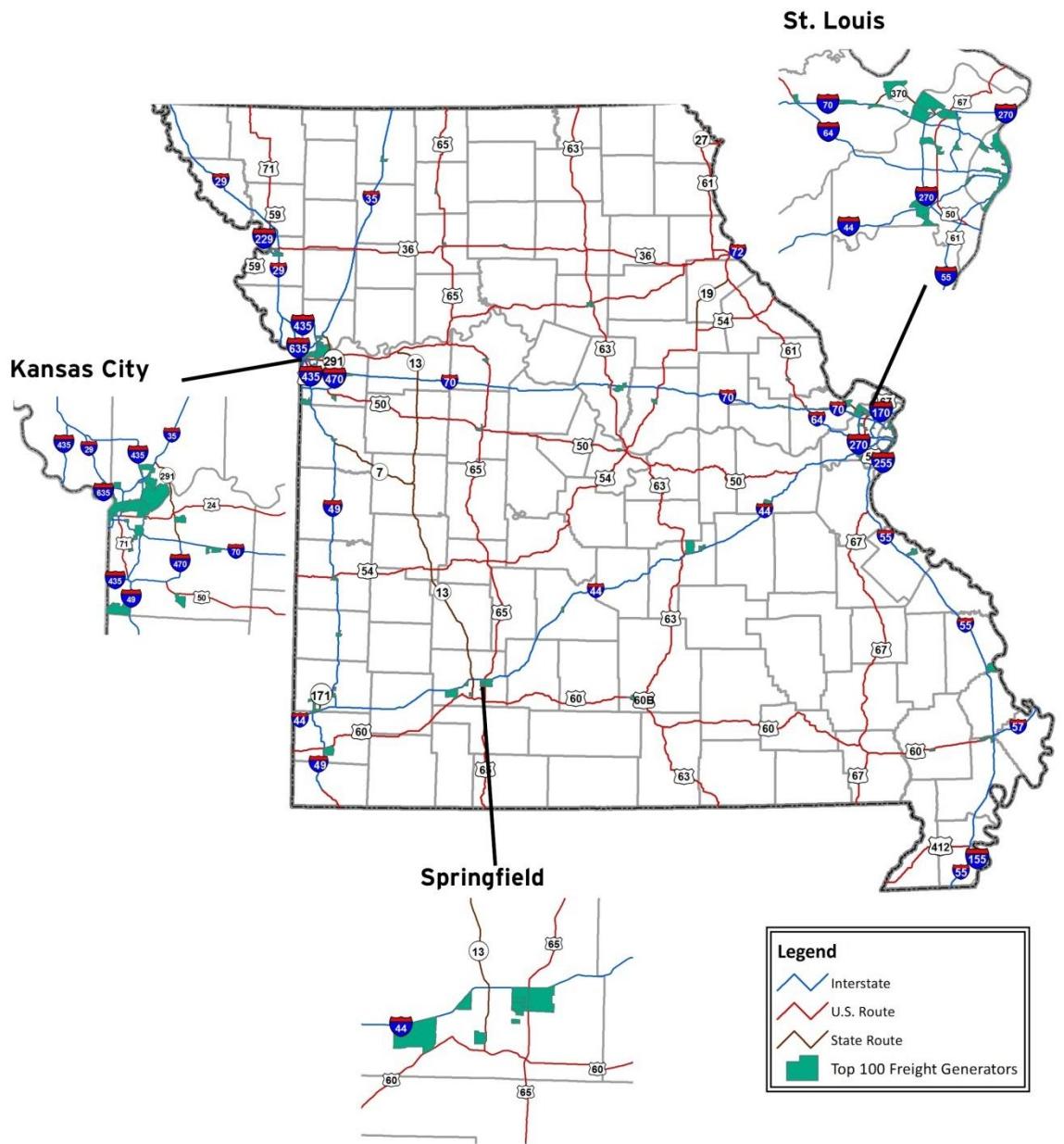
The National Transportation Atlas Data available through the Bureau of Transportation Statistics identified 115 intermodal facilities located in Missouri that provide a variety of intermodal interactions. The majority of the intermodal facilities (71%) accommodate rail – truck commodity transfers followed by modal transfers at ports (16%) and airports (8%).

Freight Generators

An analysis using GPS truck data and GIS data layers identified the top 100 most intense freight generators in Missouri. **Figure B-1** shows the location of these freight generators.

Appendix B: Trends, Needs, and Issues

Figure B-1: 100 Identified Freight Generators: Census Block Groups



Source: ATRI

Appendix B: Trends, Needs, and Issues

Condition and Performance of Freight System

Knowledge of the condition and the resulting performance of freight transport on the existing infrastructure serves to identify and aid in prioritizing freight system improvements. Appendix A also discussed the condition and performance of the highway and rail modes of freight transportation.

Condition

There are a total of 73 low vertical clearance bridges in Missouri. This represents less than one percent of all bridges owned by MoDOT. Five (four percent) of these bridges cross Interstates and 12 (nine percent) cross U.S. Highways.

In addition, to the low clearance bridges there are 4,849 load-restricted bridges in Missouri. This is about 20 percent of all bridges owned by MoDOT. One hundred thirty-five (three percent) of these bridges cross Interstates and 81 (two percent) cross U.S. Highways.

Performance

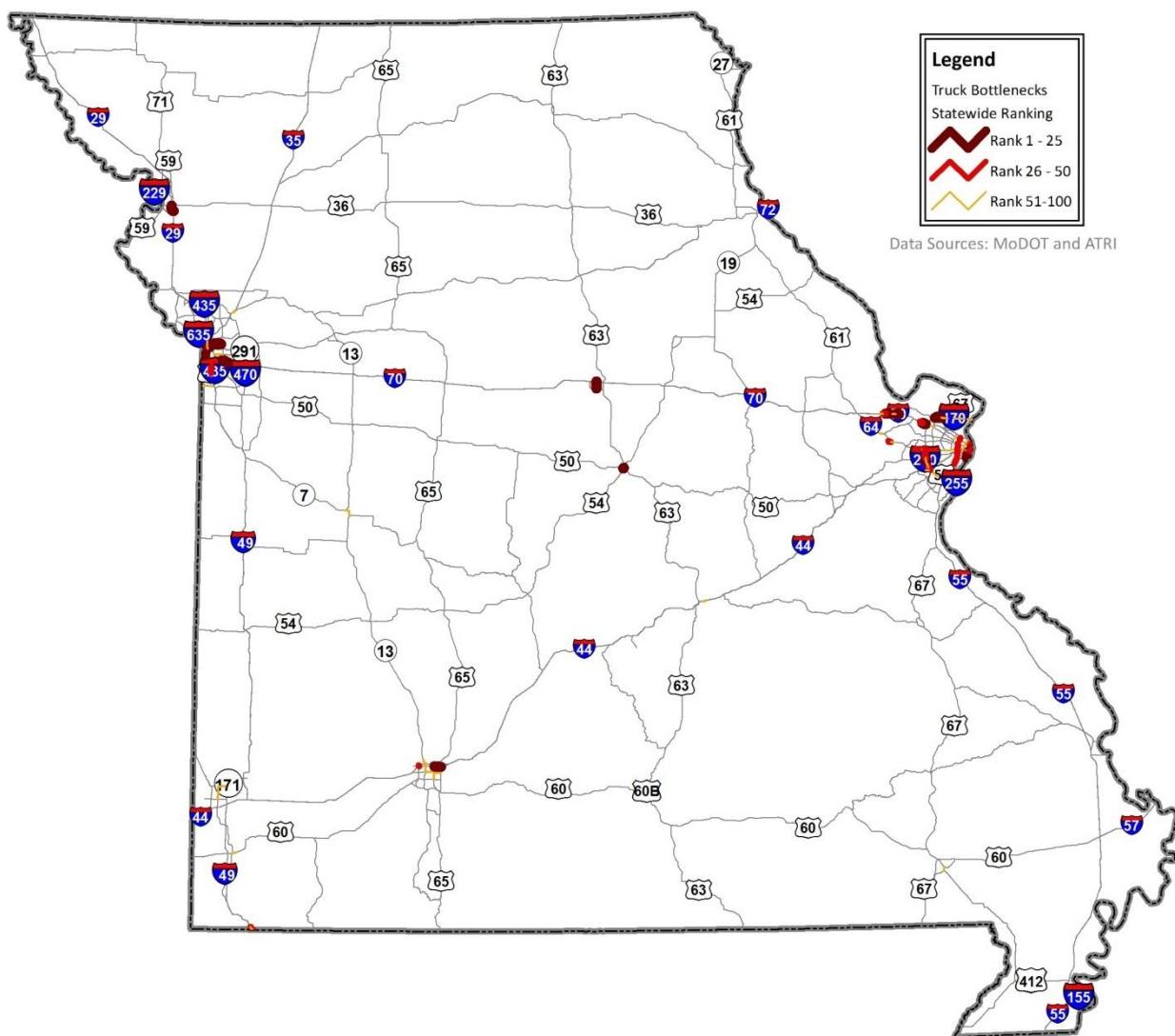
An analysis was completed to identify both highway and rail bottlenecks in the State. ATRI's (American Transportation Research Institute) Freight Performance Measures (FPM) database compiles anonymous trucking operations data from several hundred thousand trucks using Global Positioning System (GPS) data from onboard trucking systems -- generating billions of data points annually. The truck GPS data generated an average speed and numerous position counts for every hour of the day across 3,311 roadway segments where trucks equipped with the GPS units traveled. The segment speed differences were calculated through extensive analysis between the difference in peak travel times in the morning, mid-day and evening, compared to the off-peak travel times. These times were multiplied by the per-mile truck data sample size for that period. The values for the three periods were added together to generate the total congestion index.

The 100 segments with the highest congestion indices were isolated for further analysis as the top trucking bottlenecks in Missouri. St. Louis and Kansas City contained 81 out of the state's 100 worst truck bottlenecks; however, Springfield also contained several bottlenecks, with several more locations dispersed throughout cities and towns across the State **Figures B-2 and B-3** presents the 100 segments identified as bottlenecks through this analysis.

The rail bottlenecks analysis was completed using the Association of American Railroads' methodology for determining the level of service for a specific freight rail corridor. **Figure B-4** illustrates the volume-to-capacity ratio and the maximum number of trains per day for each freight rail corridor in Missouri.

Appendix B: Trends, Needs, and Issues

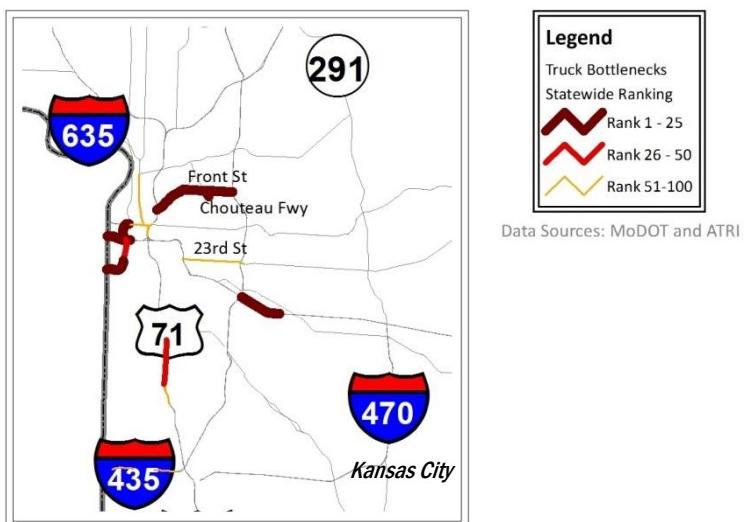
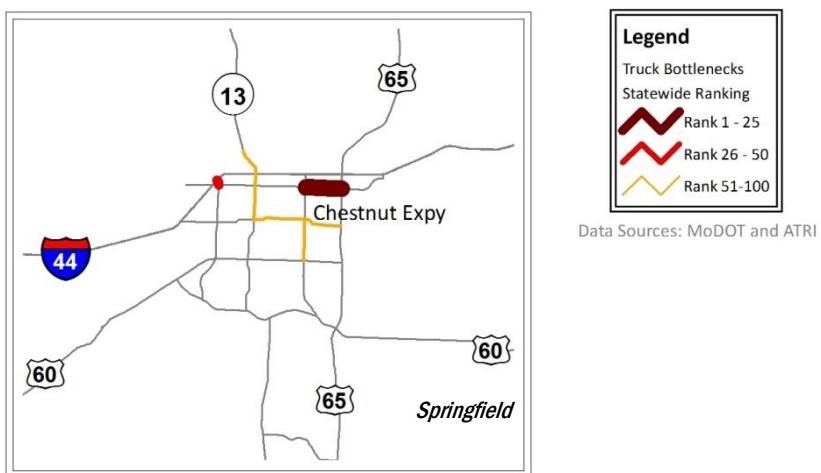
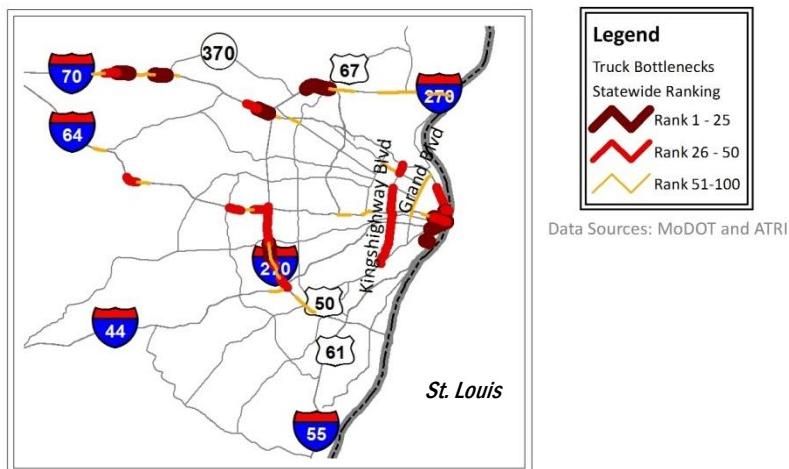
Figure B-2: Top 100 Truck Bottlenecks in Missouri



Source: CDM Smith, ATRI, ESRI

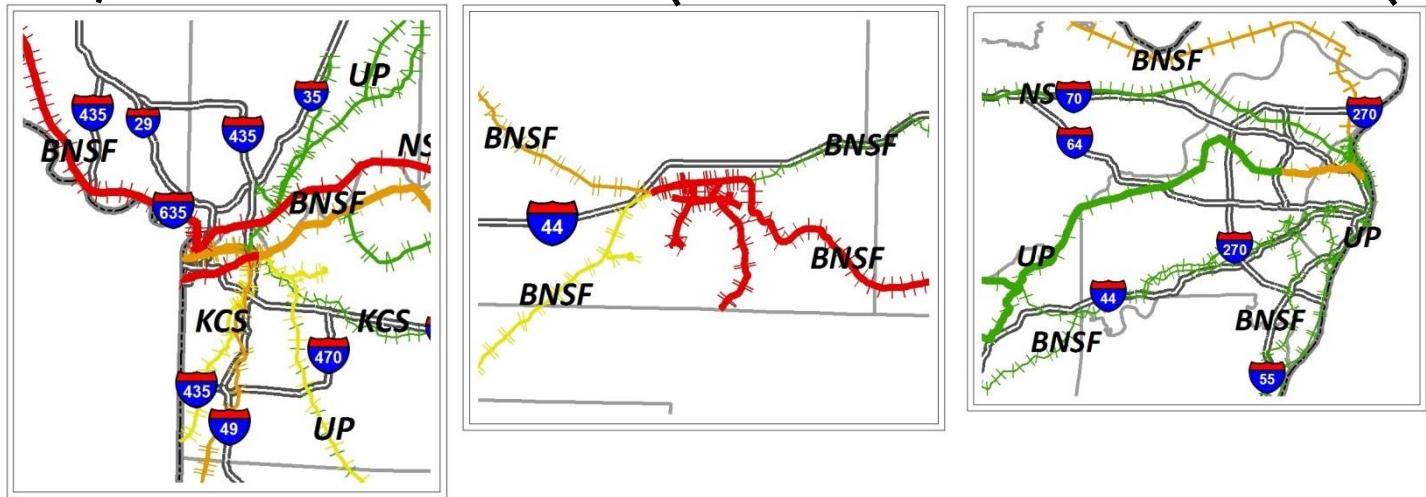
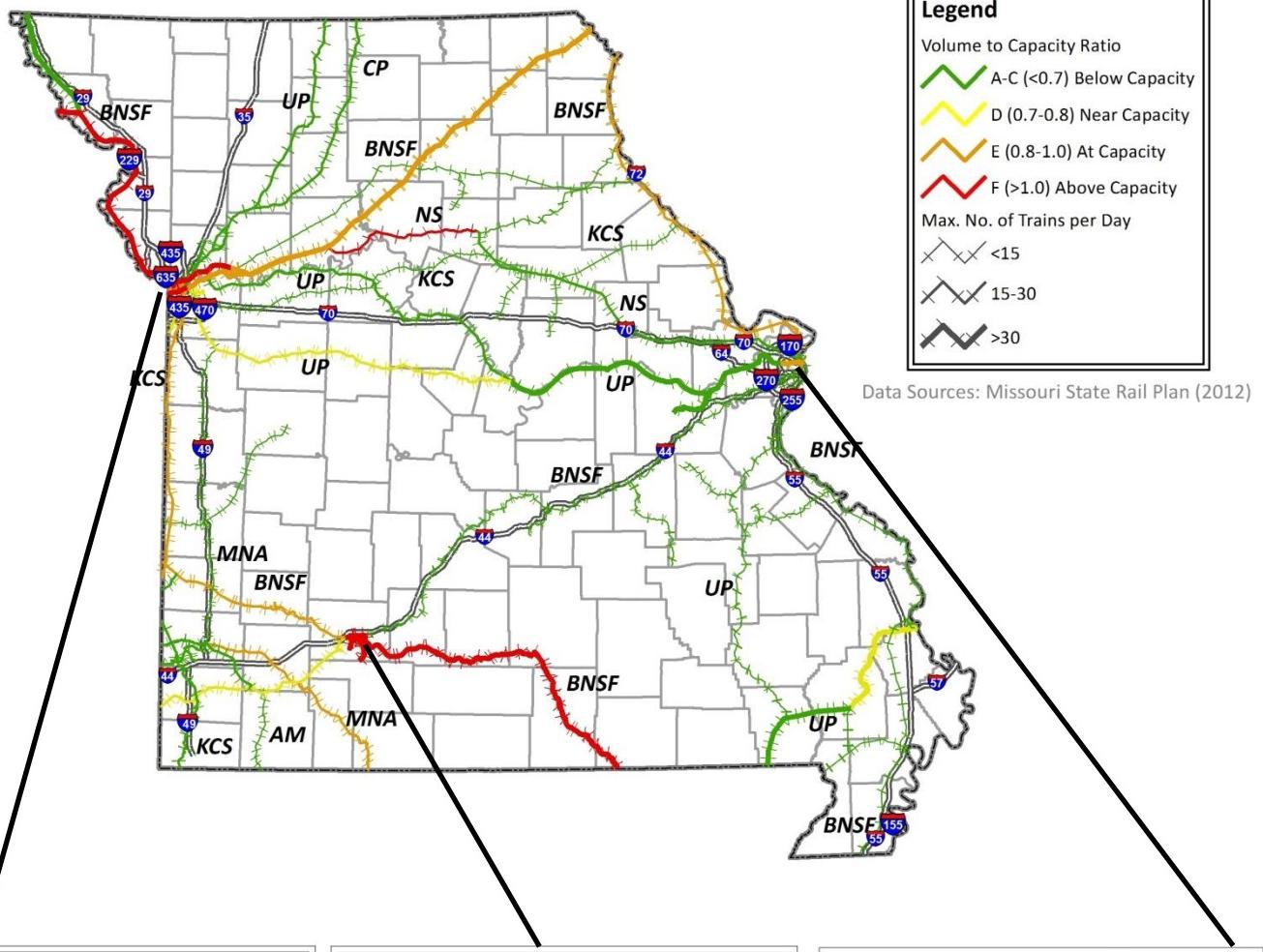
Appendix B: Trends, Needs, and Issues

Figure B-3: Regional Truck Bottlenecks



Appendix B: Trends, Needs, and Issues

Figure B 4: Rail Corridor Volume Capacity



Appendix B: Trends, Needs, and Issues

Economics

Freight Commodity Growth

The analysis of the type of freight commodities, a commodity's tonnage, a commodity's dollar value and the directional movement (into, out of, within or through Missouri) being transported help illustrate the importance of freight movements to Missouri from different perspectives. Each of these perspectives assists in estimating the economic impacts of freight movement.

Directional Movement – Directional freight movements impact Missouri differently.

- Inbound commodities from out-of-State comprise two basic types: final goods and intermediate production materials (inputs). Final goods typically go directly to consumers or to retail outlets; hence, associated economic impacts are, at most, a function of retail price markups. Comparatively, economic impacts associated with inbound materials used in Missouri manufacturing processes can be quite significant.
- Outbound commodities from Missouri to other states also represent the result of value-added Missouri production. Additionally, intrastate Missouri movements represent both value-added Missouri production and/or retail price markups.
- Freight movements through Missouri generate little, if any, economic value to the State (i.e., transport service only). Nonetheless, the magnitude of through truck and rail volumes is important in a freight plan given the effect on modal infrastructure capacity.

Commodity Tonnage and Value – While it is important to understand tonnage movements, such observations do not unilaterally address the importance of freight movements to Missouri (other considerations matter such as value, direction, mode, etc.). Top commodity tonnages (via all modes and directions, combined) are led by Coal (237.6 million, 23.4%), followed by Farm Products (129.2 million, 12.7%), and Nonmetallic Minerals (such as limestone, sand, clay and granite) (123.7 million, 12.2%); see **Table B-1**. Comparatively, the top commodity value movements (via all modes and directions, combined) are led by Miscellaneous Mixed Shipments (\$189.3 billion, 15.7%), followed by Transportation Equipment (\$163.7 billion, 13.6%), and Secondary Traffic (is common with distribution centers when products A, B, and C arrive for storage and is considered secondary traffic when the product leaves the distribution center to a retail outlet or home delivery) (\$161.7 billion, 13.4%), see **Table B-2**.

Since 2011, there are two key shifts impacting commodity movement in Missouri. First is the increase movement of crude oil by rail in Missouri and second is sand produced in eastern Missouri as a valuable input to the oil extracting process known as fracking.

The rapid increase in crude oil from the Bakken region strained existing pipeline capacities and oil refiners. As a result, between 2011 and 2012 crude oil transported by rail has increased 423 percent. With limited available oil rail cars, it is extremely important to have a quick delivery and return to the Bakken oil fields. One solution is to transfer the rail oil tankers to barges for their last leg to oil refineries. There are two Missouri locations with such capability in St. Louis and Hayti, Missouri.

Appendix B: Trends, Needs, and Issues

The St. Peter Sandstone formation mined in eastern Missouri has two unique characteristics – it is nearly pure silica and the grains are almost spherical. These features are unique and work exceptionally well in oil fracking which has led this type of sand to be called fracking sand. As a result, the silica sand is in high demand in North Dakota and Texas. There are four quarries in eastern Missouri where the silica sand is mined. Silica sand is typically transported by rail or barge.

Appendix B: Trends, Needs, and Issues

Table B-1: Top Commodities By Tonnage, 2011

STCC2	Commodity	Tons (in thousands)	
		Amount	Percent
11	Coal	237,585	23.4%
01	Farm Products	129,200	12.7%
14	Nonmetallic Minerals	123,662	12.2%
20	Food or Kindred Products*	98,474	9.7%
28	Chemicals or Allied Products	84,647	8.3%
50	Secondary Traffic	83,952	8.3%
29	Petroleum or Coal Products	47,132	4.6%
46	Misc Mixed Shipments	37,592	3.7%
32	Clay, Concrete, Glass or Stone	31,538	3.1%
37	Transportation Equipment	19,410	1.9%
	Remaining Commodities	123,557	12.2%
	Total	1,016,748	100.0%

*kindred products includes manufactured or processed foods for human consumption such as manufactured ice, chewing gum and animal or vegetable cooking oils and fats.

Source: TRANSEARCH® data for 2011

Table B-2: Top Commodities By Value, 2011

STCC2	Commodity	Value (in millions)	
		Amount	Percent
46	Misc Mixed Shipments	\$189,344	15.7%
37	Transportation Equipment	\$163,658	13.6%
50	Secondary Traffic	\$161,694	13.4%
28	Chemicals or Allied Products	\$134,438	11.2%
20	Food or Kindred Products	\$99,907	8.3%
01	Farm Products	\$57,608	4.8%
35	Machinery	\$57,147	4.7%
36	Electrical Equipment	\$54,732	4.5%
33	Primary Metal Products	\$50,411	4.2%
29	Petroleum or Coal Products	\$42,095	3.5%
	Remaining Commodities	\$194,573	16.1%
	Total	\$1,205,607	100.0%

Source: TRANSEARCH® data for 2011

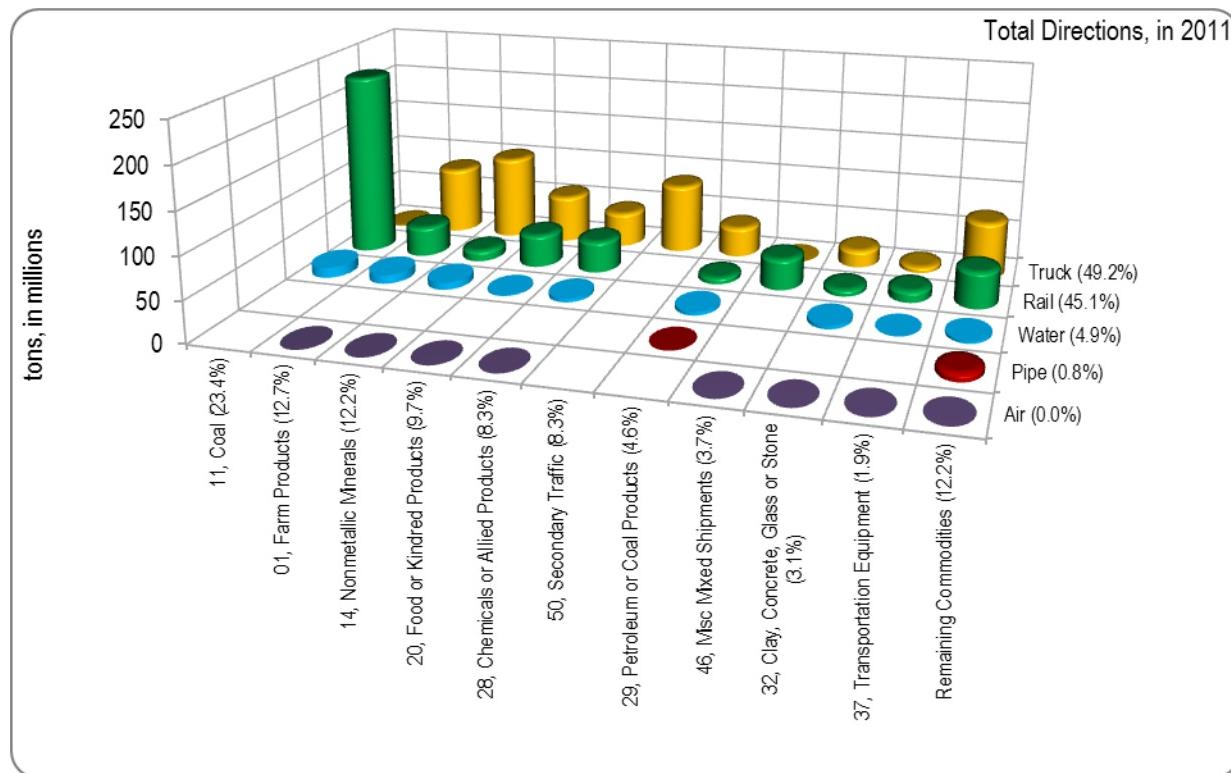
Commodity Tons by Mode – Figure B-5 illustrates modal differences by commodity tonnage. Truck leads most commodity ton movements, especially Farm Products, Nonmetallic Minerals, and Secondary Traffic, as well as other Remaining Commodities; however, rail-based Coal is by far the largest single commodity movement. Port, air, and pipeline commodity ton movements are all dwarfed by truck and rail.

Commodity Value by Mode – Figure B-6 shows modal differences by commodity value, as compared to the ton volumes. A similar pattern is observed, with truck-based commodity movement generally

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exceeding all other modes, especially, Food and Kindred Products, Farm Products, Secondary Traffic, and other Remaining Commodities. However, rail-based Miscellaneous Mixed Shipments are the largest movement by value, and rail-based Transportation Equipment movement value exceeds truck. Similarly to tonnage movements, the port, air, and pipeline value movements are all insignificant compared to either truck or rail.

Figure B-5: Top Commodities by Tonnage and Mode, 2011

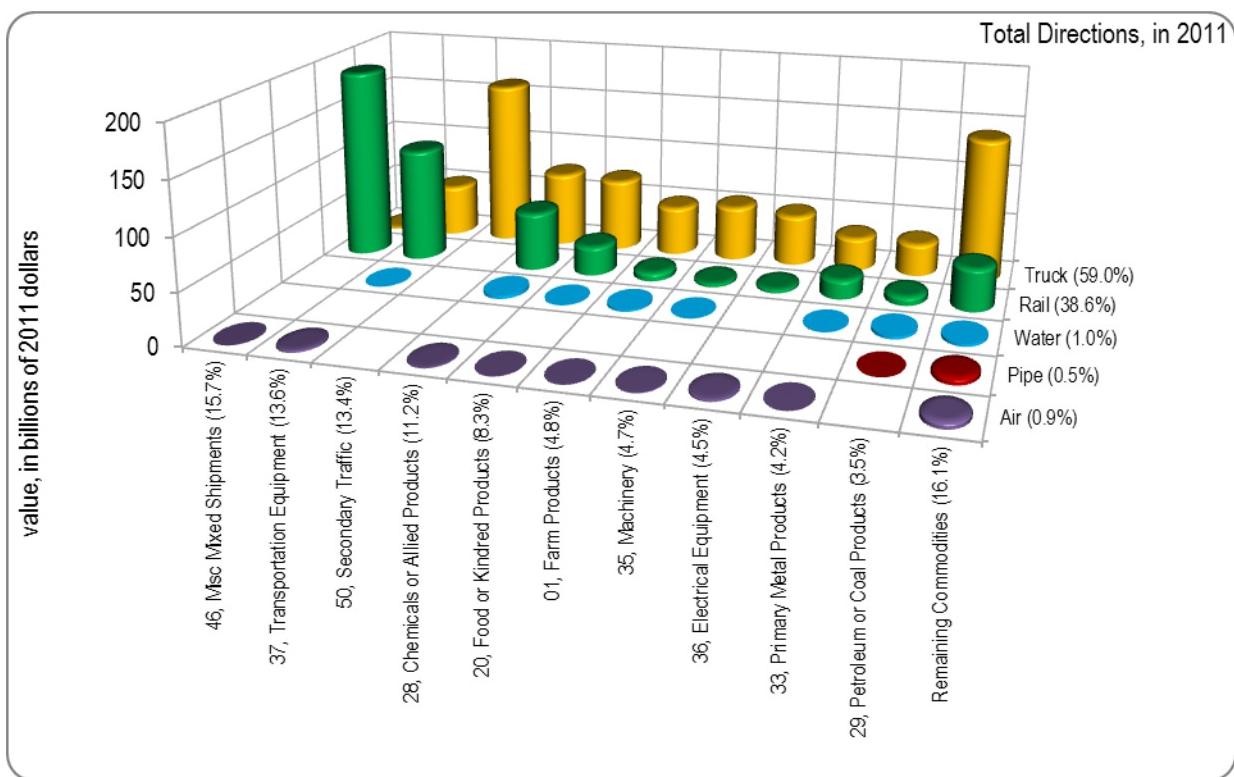


Source: TRANSEARCH® data for 2011

Reliance on the highway and rail systems will continue into the future as the primary freight modes in Missouri. Missouri is and will continue to accommodate a large percentage of through freight movements which places a strain on the Missouri system due to maintenance requirements from the freight passing through the State.

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Figure B-6: Top Commodities by Value and Mode, 2011



Source: TRANSEARCH® data for 2011

Freight tonnage across the Missouri freight network is forecast to grow 37.3 percent from 2011 to 2030 (1.7 percent annually). Truck and rail are by far the dominant modes of freight transportation in Missouri. Truck movements account for 49 percent of the total tonnage and rail movements account for 45 percent. Truck growth is forecast to grow by 55.5 percent (2.4 percent annually), from 500.4 million tons in 2011 to 778.1 million in 2030, a 277.7 million ton increase. In the context of the aggregate 378.8 million ton growth forecast for all combined modes, this 277.7 million increase in truck constitutes 73.3 percent, about half of which is attributable to through movements. While rail growth is forecast to grow by 19 percent (0.9 percent annually), from 458.1 million tons in 2011 to 545.2 million tons in 2030, it still constitutes 40 percent of the total tonnage moved through Missouri. Additional details are available in Appendix A.

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Truck Forecast

Table B-3 depicts the directional composition of truck movements in Missouri between 2011 and 2030, which is relatively constant over the future analysis horizon. Truck tonnage is forecast to increase from 500.4 million in 2011 to 778.1 million in 2030, a cumulative increase of 55.5% (2.4% annually). Truck commodity value is forecast to increase from \$710.9 billion in 2011 to \$1.20 trillion by 2030, a cumulative increase of 68.4% (2.8% annually). Truck freight density growth across the Missouri road network is shown in **Figure B-7**, which indicates the greatest volume increases on I-44 and I-55.

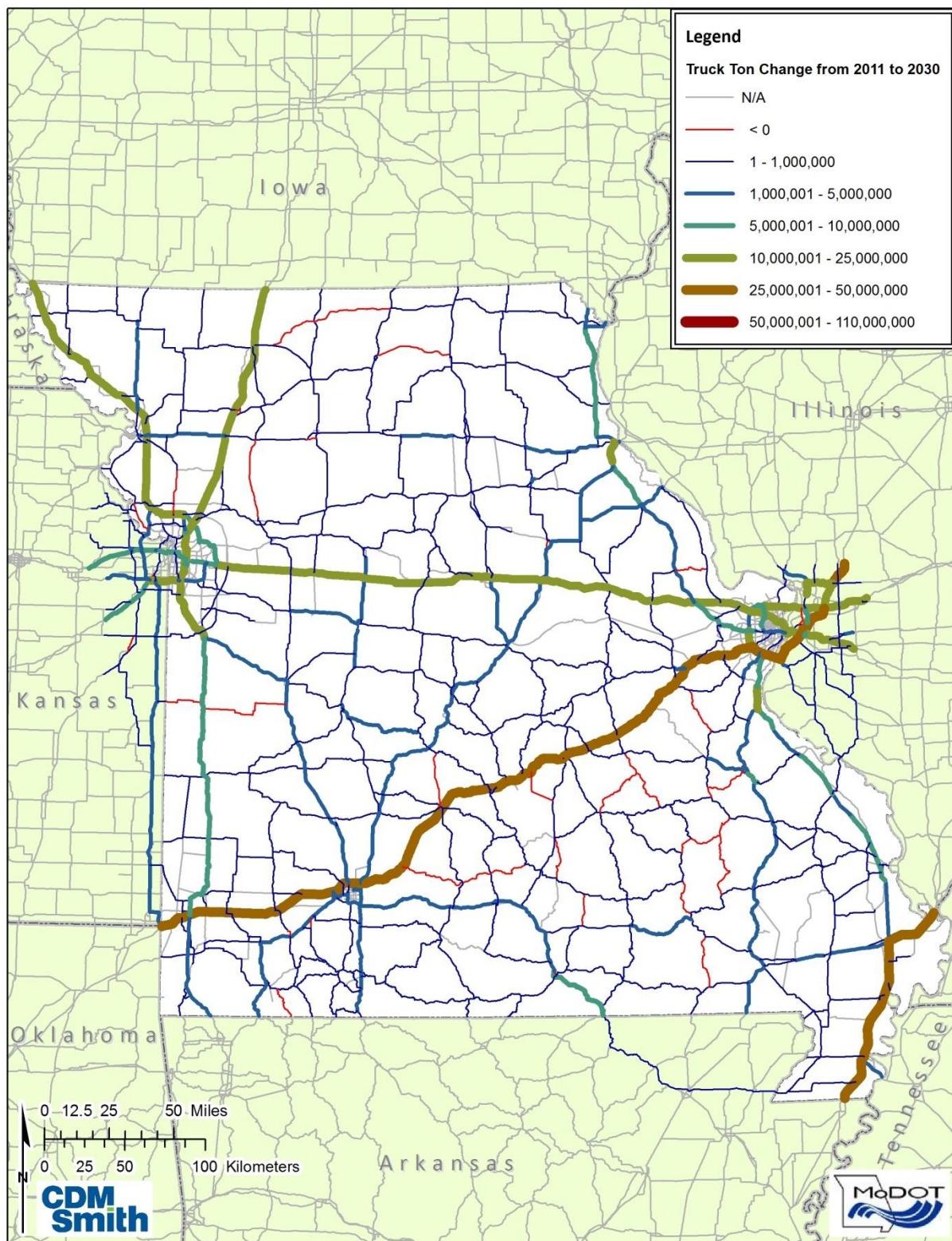
Table B-3: Truck Forecast by Direction, 2011 to 2030

Direction	2011		2030		Percent Change	
	Amount	Percent	Amount	Percent	Total	CAGR
Tons						
Outbound	75,301,621	15.0%	108,430,027	13.9%	44.0%	1.9%
Inbound	89,250,507	17.8%	129,095,659	16.6%	44.6%	2.0%
Intra	105,627,915	21.1%	182,656,763	23.5%	72.9%	2.9%
Through	230,212,488	46.0%	357,953,967	46.0%	55.5%	2.4%
Total	500,392,531	100.0%	778,136,417	100.0%	55.5%	2.4%
Value, in millions						
Outbound	\$95,005	13.4%	\$139,161	11.6%	46.5%	2.0%
Inbound	\$119,731	16.8%	\$194,892	16.3%	62.8%	2.6%
Intra	\$62,346	8.8%	\$78,333	6.5%	25.6%	1.2%
Through	\$433,794	61.0%	\$784,501	65.5%	80.8%	3.2%
Total	\$710,876	100.0%	\$1,196,888	100.0%	68.4%	2.8%

Source: TRANSEARCH® data for 2011

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Figure B-7: Truck Ton Growth, 2011 to 2030



Source: TRANSEARCH® data for 2011

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By 2030, the Missouri highway freight system is projected to support more than 63.2 million truck trips which will total over of 778.1 million tons and be valued at \$1.20 trillion with an average value/ton of \$1,538. The top five truck commodities by tonnage, units, value and growth can be reviewed in Appendix A.

Rail Forecast

Table B-4 depicts the directional composition of rail movements in Missouri between 2011 and 2030, which is relatively constant over the future analysis horizon. Rail tonnage is forecast to increase from 458.1 million in 2011 to 545.2 million in 2030, a cumulative increase of 19.0% (0.9% annually). Rail commodity value is forecast to increase from \$465.0 billion in 2011 to \$790.6 billion by 2030, a cumulative increase of 70.0% (2.8% annually). Note that inbound tonnage is forecast to decline.

Freight density growth across the Missouri rail network is shown in **Figure B-8**, which indicates the greatest rail volume increases on the BNSF line connecting Kansas City and Chicago.

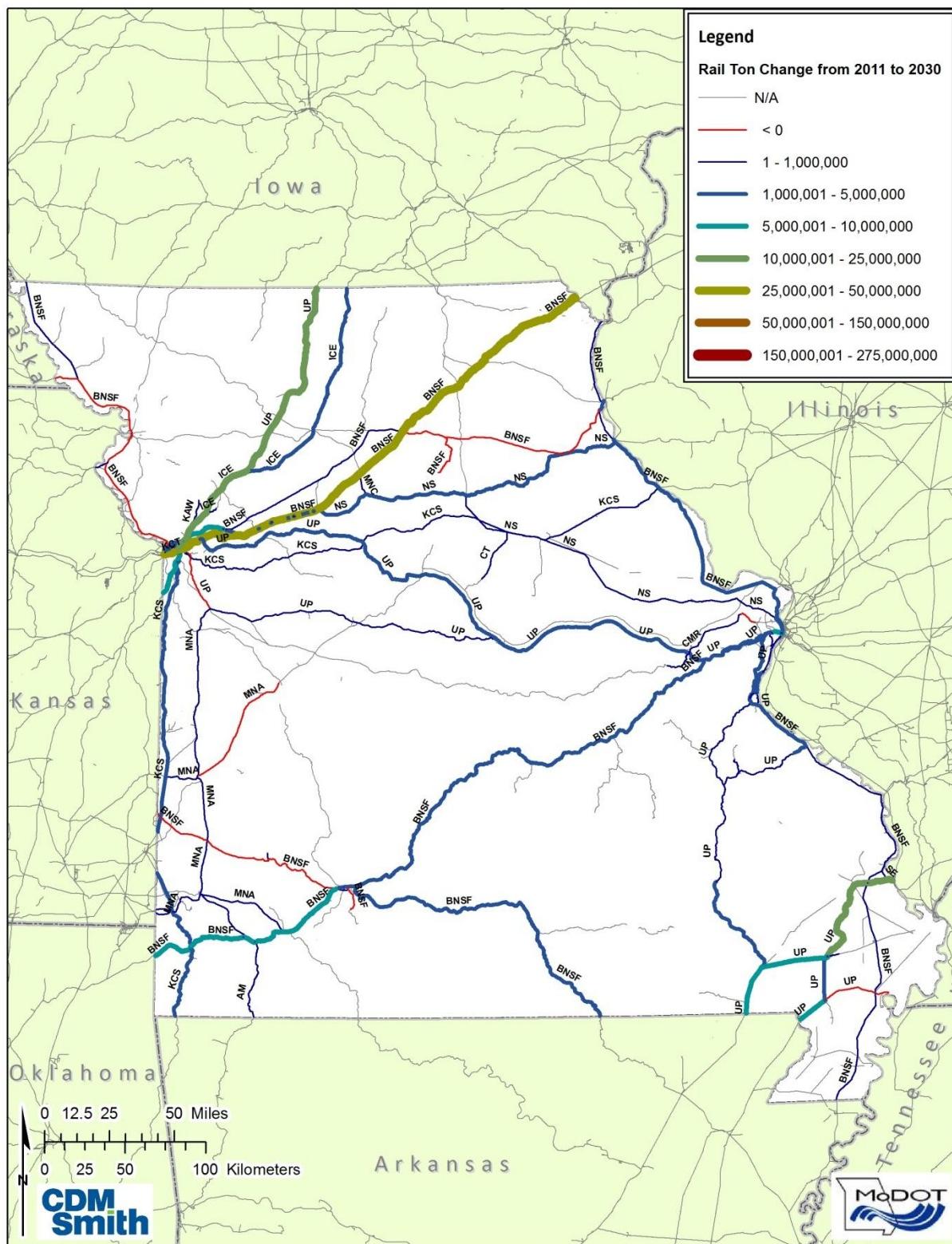
Table 4: Rail Forecast by Direction, 2011 to 2030

Direction	2011		2030		Percent Change	
	Amount	Percent	Amount	Percent	Total	CAGR
Tons						
Outbound	21,510,433	4.7%	35,366,325	6.5%	64.4%	2.7%
Inbound	92,326,793	20.2%	90,178,404	16.5%	-2.3%	-0.1%
Intra	2,436,087	0.5%	3,237,194	0.6%	32.9%	1.5%
Through	341,805,597	74.6%	416,384,127	76.4%	21.8%	1.0%
Total	458,078,910	100.0%	545,166,049	100.0%	19.0%	0.9%
Value, in millions						
Outbound	\$40,364	8.7%	\$67,228	8.5%	66.6%	2.7%
Inbound	\$39,647	8.5%	\$64,535	8.2%	62.8%	2.6%
Intra	\$1,616	0.3%	\$3,393	0.4%	110.0%	4.0%
Through	\$383,409	82.4%	\$655,439	82.9%	71.0%	2.9%
Total	\$465,035	100.0%	\$790,595	100.0%	70.0%	2.8%

Source: TRANSEARCH® data for 2011

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Figure B-8: Rail Ton Growth, 2011 to 2030



Source: TRANSEARCH® data for 2011

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The anticipated rail movement in Missouri is expected to total 545.2 million tons, carried via 12.0 million rail cars, valued at \$790.6 billion in 2011 with an average value/ton of \$1,450. The top five rail commodities by tonnage, units, value and growth can be reviewed in Appendix A.

Port Forecast

Table B-5 depicts the projected directional composition of public port movements in Missouri between 2011 and 2030, which is relatively constant over the future analysis horizon; but, intrastate movements increase somewhat (albeit, continuing to be relatively insignificant compared to other directional port movements). Port tonnage is forecast to increase from 49.9 million in 2011 to 63.3 million in 2030, a cumulative increase of 26.9% (1.3% annually). Port commodity value is forecast to increase from \$12.5 billion in 2011 to \$15.4 billion by 2030, a cumulative increase of 23.1% (1.1% annually).

Table 5: Port Forecast by Direction, 2011 to 2030

Direction	2011		2030		Percent Change	
	Amount	Percent	Amount	Percent	Total	CAGR
Tons						
Outbound	19,973,291	40.1%	25,917,689	41.0%	29.8%	1.4%
Inbound	5,093,847	10.2%	5,906,771	9.3%	16.0%	0.8%
Intra	4,941,503	9.9%	9,565,245	15.1%	93.6%	3.5%
Through	19,850,043	39.8%	21,865,151	34.6%	10.2%	0.5%
Total	49,858,684	100.0%	63,254,857	100.0%	26.9%	1.3%
Value, in millions						
Outbound	\$3,479	27.7%	\$4,302	27.8%	23.6%	1.1%
Inbound	\$3,083	24.6%	\$4,060	26.3%	31.7%	1.5%
Intra	\$117	0.9%	\$253	1.6%	116.2%	4.1%
Through	\$5,870	46.8%	\$6,833	44.2%	16.4%	0.8%
Total	\$12,549	100.0%	\$15,448	100.0%	23.1%	1.1%

Source: TRANSEARCH® data for 2011

The 2030 commodity movements by port are estimated to reach 63.3 million tons, be valued at \$15.4 billion and have an average value/ton of \$244. The top five port commodities by tonnage, units, value, and growth can be reviewed in Appendix A.

Air Forecast

Table B-6 depicts the directional composition of air movements in Missouri between 2011 and 2030, which changes somewhat over the future analysis horizon; outbound movements decrease in relative proportion, while inbound movements increase. Air tonnage is forecast to increase from 73,003 in 2011 to 139,296 in 2030, a cumulative increase of 90.8% (3.5% annually). Air commodity value is forecast to increase from \$11.4 billion in 2011 to \$27.5 billion by 2030, a cumulative increase of 141.8% (4.8% annually).

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Table B-6: Air Forecast by Direction, 2011 to 2030

Direction	2011		2030		Percent Change	
	Amount	Percent	Amount	Percent	Total	CAGR
Tons						
Outbound	34,313	47.0%	54,382	39.0%	58.5%	2.5%
Inbound	38,249	52.4%	84,077	60.4%	119.8%	4.2%
Intra	370	0.5%	726	0.5%	96.2%	3.6%
Through	71	0.1%	112	0.1%	56.8%	2.4%
Total	73,003	100.0%	139,296	100.0%	90.8%	3.5%
Value, in millions						
Outbound	\$7,620	66.9%	\$16,592	60.3%	117.7%	4.2%
Inbound	\$3,656	32.1%	\$10,681	38.8%	192.1%	5.8%
Intra	\$100	0.9%	\$245	0.9%	144.5%	4.8%
Through	\$10	0.1%	\$16	0.1%	65.2%	2.7%
Total	\$11,387	100.0%	\$27,534	100.0%	141.8%	4.8%

Source: TRANSEARCH® data for 2011

The 2030 commodity movements by air are estimated to reach 139,296 tons and be valued at \$27.5 billion, with an average value/ton of \$197,667. The top five rail commodities by tonnage, units, value and growth are shown in Appendix A.

Pipeline Forecast

Table B-7 depicts the directional composition of pipeline movements in Missouri between 2011 and 2030, which remains completely constant over the future analysis horizon. Pipeline tonnage is forecast to increase from 8.3 million tons in 2011 to 8.9 million in 2030, a cumulative increase of 6.5% (0.3% annually). Pipeline commodity value is forecast to increase from \$5.8 billion in 2011 to \$6.1 billion by 2030, a cumulative increase of 6.5% (0.3% annually).

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Table B-7: Pipeline Forecast by Direction, 2011 to 2030

Direction	2011		2030		Percent Change	
	Amount	Percent	Amount	Percent	Total	CAGR
Tons						
Outbound	N/A	N/A	N/A	N/A	N/A	N/A
Inbound	932,258	11.2%	993,713	11.2%	6.6%	0.3%
Intra	N/A	N/A	N/A	N/A	N/A	N/A
Through	7,412,827	88.8%	7,896,550	88.8%	6.5%	0.3%
Total	8,345,085	100.0%	8,890,264	100.0%	6.5%	0.3%
Value, in millions						
Outbound	N/A	N/A	N/A	N/A	N/A	N/A
Inbound	\$643	11.2%	\$686	11.2%	6.6%	0.3%
Intra	N/A	N/A	N/A	N/A	N/A	N/A
Through	\$5,117	88.8%	\$5,451	88.8%	6.5%	0.3%
Total	\$5,761	100.0%	\$6,137	100.0%	6.5%	0.3%

Source: TRANSEARCH® data for 2011

In Missouri, growth in pipeline movements is effectively attributable to increases in only one commodity: Crude Petroleum and Natural Gas. A majority of that tonnage and value increase will be from pipeline movements traveling through Missouri.

Trade and Industry Growth

There is a close relationship between industrial health and vitality and available transportation options. Industries need parts and supplies to manufacture products that are then transported across the state, country, and world. In Missouri, the goods range from agricultural grains and food products to automobiles. Transportation is responsible for bringing supplies into Missouri as well as exporting the products of Missouri industries.

Nationally, continued growth in employment and investment in advanced industries is occurring. These industries include pharmaceuticals and medicine; industrial machinery; commercial and service industry machinery; engines, turbines, and power transmission equipment; communications equipment; measurement and calibration equipment; electro-medical and control instruments; aerospace products and parts; motor vehicles; and medical equipment and supplies. Advanced industries account for 11 percent of Gross Domestic Product and 80 percent of all private-sector research and development investments, as well as one-third of all U.S. exports. These industries employ over 7.4 million in the U.S. and almost half of those jobs are available to workers with less than a four-year college degree. Advanced industries rely on thousands of domestic supplier firms supporting an estimated 5.1 million additional jobs in their direct supply chains. These industries are projected to add an estimated 2 million new jobs over the next 10 years; wages in this sector are almost twice as much on average as non-advanced industry companies. Regions and states are actively recruiting firms in these sectors and providing incentives to retain these businesses. Many advanced

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industries are transportation-dependent. Advanced Manufacturing Industries in Missouri employed 175,396 workers in 2012 and average annual salaries were \$77,060.

Manufacturing productivity in the U.S. increased 73 percent between 1993 and 2011 according to the U.S. Department of Commerce, contributing \$1.87 trillion to the U.S. economy in 2012. More than 60 percent of U.S. exports are manufactured goods, and as new markets continue to open and global incomes continue to improve, businesses stand to achieve even greater export-related revenues and profits. Although direct manufacturing jobs have declined over the past two decades, indirect jobs in engineering, design, marketing, and finance that support manufacturing operations generate 68 cents for every dollar of manufacturing wages. Today U.S. manufacturing accounts for 20 percent of the world's manufacturing output and U.S. manufacturing value-added (for example, the increase in the value of individual auto parts versus the value of a finished vehicle) is greater than that of China, India, Brazil, and Russia combined.

Exports of aircraft have doubled since 2009, driven by demands from Asia and the Middle East, and industry experts project a significant increase in the size of global aircraft fleets by 2031 which can translate to significant business opportunities for the Missouri aerospace and aviation sector. In Missouri 14,235 are employed in aerospace products and aerospace parts manufacturing with average annual salaries of \$102,882.

The most export-dependent industries in Missouri (those industries that export 50 to 75 percent of production internationally) include: agricultural products, food, mining machinery and equipment, communication and energy wire manufacturing, chemical manufacturing, measurement and calibration equipment manufacturing.

Export industries in Missouri account for 95,000 direct jobs. The St. Louis metro area exported \$19 billion in goods and services in 2012, reflecting a 7.9 percent growth in exports from 2009 – 2012. The top three export gainers were aircraft, motor vehicles, non-ferrous metal products. The Kansas City metro area exported \$11.5 billion in goods during 2012, resulting in an 8.7 percent growth in exports from 2009 – 2012. The top three export gainers were motor vehicles, aircraft, and communications equipment.

Chemicals are Missouri's second largest international export and employ over 17,000 workers, with clusters in St. Louis and northeast and northwest Missouri. U.S. chemical companies have earmarked \$25 billion in new investments for expansion of existing facilities or construction of new facilities according to a recent study by the American Chemistry Council. Missouri may be able to benefit from these new investments. The availability of lower cost energy and feedstock from shale gas has significantly improved the outlook for chemical manufacturing, although some risks on the horizon still exist in regulatory environments, as well as supply line concerns in new growth economies.

Missouri food and food ingredient exports have increased by 148% since 2005. Top agriculture export products include soybeans, corn, cotton, pork, vegetable oils, oilcake, meal, and wheat. Major food processing companies in Missouri include: Farmland, Fricks, IDF, Russell Stover, Anheuser-Busch, Bissinger's, and McCormick Distilling. Increasing global wages have resulted in increased demand for U.S. agricultural products due to higher quality standards and variety.

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The Panama Canal, originally constructed in 1914, is now undergoing a \$5.25 billion expansion to be completed in 2015. The completion of the canal opened one of the most important trade links in the world by linking the Atlantic and Pacific Oceans. When the canal expansion is complete the new locks will allow for deeper, longer and wider vessels, doubling its existing throughput capacity⁴. Reduction of transportation costs due to Canal expansion could affect the movement of goods on inland waterways in two ways. A reduction in ocean transportation costs out of Gulf ports due to the use of larger, more efficient ships will tend to reduce aggregate costs of exporting bulk commodities, such as grain, by the Mississippi River route rather than by rail through Pacific Northwest ports. Second, lower transportation costs attributable to expansion of the Canal could increase export volumes as the transportation element of U.S.-produced commodity costs helps to make U.S. exports more competitive in world markets. While the scale and timing of the impacts to Missouri freight flows is unknown at this time, it is anticipated that the expansion will change international trade flows and change the demands on transportation networks, service and operation.

All of these growth factors will lead to a growth in freight movements within Missouri. The growth in freight movements will result in increasing demands on the highways, rail lines, port facilities and airports handling air cargo freight.

Institutional and Regulatory Trends

Federal regulatory trends may affect Missouri freight transportation. An example would be the implications from incremental Federal regulation of trucking and trucker safety (e.g. hours of service (HOS)), electronic logging devices (ELD), compliance-safety-accountability (CSA), EPA truck engine /reefer trailer regulations) or even speculation about how truck size and weight affects trucking services pricing, trucking network operations and mode choice. These trends may increase the cost of freight movements by truck, resulting in some commodities possibly switching to a different mode. A driver shortage may increase the transport time and affect frequency of deliveries, or require distribution centers, warehouses, and stores to maintain a larger backlog of products.

Other freight-related trends might be recent public-private partnerships (P3), which involve use of private capital for transportation infrastructure projects. In these cases, availability payment mechanisms are becoming more preferred on the part of investors compared with earlier pure operating concession / equity investments. This trend could impact freight by increased operating cost in the form of tolls; however, freight would also benefit through a greater reliability of the highway facility.

Other possible trends in the Federal public policy area which could affect transportation include:

- Federal water resource policy-making criteria can significantly impact the reliability of waterborne freight usage from year to year by reducing the navigable days during extreme conditions.

⁴ Panama Canal Expansion Study – Phase I Report, US Department of Transportation, November 2013.

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- The aging and outdated lock and dam system is in need of replacement to efficiently accommodate barges; however, there is currently no Congressional funding to accomplish this. A lock and dam failure could dramatically shift barge commodities to rail or truck.
- U.S. Department of Agriculture (USDA) and foreign government food product traceability requirements make bulk (barge, unit train) food shipping less attractive to some shippers.
- U.S. Department of Homeland Security (DHS) requirements for electronic pre-filing of export documentation for exported commodity shipments are viewed by some shippers as an impediment to export flows, as it potentially adds time. This may lead to an increase in foreign trade zones for export shipments as a way to consolidate security procedures.
- U.S. Environmental Protection Agency (EPA) additional tier emissions requirements for marine diesel barge engines and rail locomotive engines will increase costs to companies which would be required to retrofit or replace existing engines.
- Connected Vehicles is an emerging technology that allows vehicles to travel closer together, at a consistent speed through the use of technology. The use of dedicated short range communications allows vehicles to share speed and braking information, allowing surrounding vehicles to automatically adjust. It can provide a more reliable travel time on the highways by reducing crashes and travel speed variations.
- At the local and statewide level, the acceptance of “Complete Streets” is a growing trend that may impact the movement of freight, particularly in the last mile of delivery. To date 18 cities/counties and five regional planning organizations have “Complete Street” policies. The Missouri General Assembly passed a resolution in support of Complete Street policies at all levels of government in May 2011. With a growing trend of increasing home delivery of products ordered on-line and in-store, Complete Street policies need to plan for ways to accommodate home delivery vehicles.

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MAP-21 Comprehensive Truck Size and Weight Study

During the last transportation reauthorization (MAP-21), Congress called on the USDOT to conduct a study on specific areas of federal truck size and weight limits, including their operation and their impacts. Congress requested an evaluation of several alternative truck configurations (Table B-8). The analysis of these configurations will address differences in safety risks, infrastructure impacts, and the effect on levels of enforcement between trucks operating at or within Federal limits and trucks legally operating in excess of Federal limits. The study will also estimate the effects of freight diversion from other modes due to these alternative configurations. The results of this study are due to Congress prior to the next transportation reauthorization. Currently the study is scheduled to be completed in the fall of 2014. These shifts could affect the volume of truck traffic that would be required to carry a given amount of freight and the weights of trucks traveling on different parts of the highway system. These changes in turn will affect safety, infrastructure preservation costs, productivity, energy consumption, environmental emissions and other factors.

Table B-8: Configurations for Analysis in the Comprehensive Truck Size and Weight Limits Study⁵

Configuration	Configuration Description	Trailers or Semi-Trailers (#)	Axes (#)	Gross Vehicle Weight (lbs.)
1.	Five-axle vehicle	1	5	80,000 [baseline]
		1	5	88,000
2.	Six-axle vehicle	1	6	91,000
		1	6	97,000
3.	Tractor plus two 28 or 28 ½ foot trailers	2	6	80,000 [baseline]
4.	Tractor plus twin 33 foot trailers	2	6	80,000
5.	Tractor plus three 28 or 28 ½ foot trailers	3	7	105,500
6.	Tractor plus three 28 or 28 ½ foot trailers	3	9 or 10	129,000

Source: FHWA Freight Management and Operations web: <http://www.ops.fhwa.dot.gov/freight/sw/map21tswstudy/index.htm>

Regulatory Impacts on Trucking Labor Productivity and Availability

The Federal Motor Carrier Safety Administration (FMCSA) regulates hours of service (HOS) for commercial truck drivers with the goal of preventing job conditions from causing excess fatigue in order to increase safety. In general, drivers of property-carrying commercial vehicles are limited to driving a maximum of 11 hours after 10 consecutive hours off duty. Drivers are also limited to 60 hours of driving in seven days or 70 hours in 8 days. FMCSA updated HOS regulations in December 2011 to limit '34-hour restarts' to once per week. This provision allows for a driver to 'reset' the amount of hours they have driven for a given week by being off-duty for 34 consecutive hours. The new rule also requires

⁵ FHWA Freight Management and Operations web: <http://www.ops.fhwa.dot.gov/freight/sw/map21tswstudy/index.htm>

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drivers to take a 30 minute rest every 8 hours.⁶ The new provisions took effect July 1, 2013, after many legal challenges that prevented the FMCSA from reducing the HOS from 11 to 10 hours per shift. If regulations limit the operating hours of drivers further, the trucking industry's delivery capacity will also be restricted. The trucking industry is already experiencing a driver shortage, creating a strain on the industry capacity to move freight. Further operating restrictions will only add to this strain.

Federal regulations also require all interstate truck drivers to be 21 years of age or older. However, states are able to set their own age requirement for drivers operating intrastate; in Texas, that age is 18. The trucking industry has raised concerns that the federal age requirement for interstate trucking restricts the labor market for drivers. Combining this restriction with the discretion insurance companies place on young potential truck drivers, carriers often prefer to hire individuals over the age of 23. This is perceived as a negative by the industry because as individuals get older, start families and have increased responsibilities, the long hours and variable locations associated with the truck driving profession may become less desirable to the drivers.

Population

The economy is driven by people. It takes people to produce and manufacture the goods and products that are shipped out of Missouri and it is people that drive the demand for consumable goods within Missouri. As such, an examination of Missouri's projected population trends and growth is a key element in the future of freight.

Population Trends

As Missouri's population and employment grows, the demand for and production of finished goods that will be transported will also increase throughout the state. According to Woods and Poole Economic data, Missouri is expected to have an annual growth rate of 0.62 percent from 2012 to 2040. This results in over a million additional Missourians by 2040. **Table B-9** shows the 10 fastest growing counties by annual growth rate. These growth counties are all located near urban areas of St. Louis, Kansas City, Columbia, Springfield/Branson and Joplin.

Table B-9: Highest Projected Annual Growth Rate by County

County	2012 Population	2040 Population	Annual Growth Rate
Christian	79,824	143,530	2.12
Platte	92,054	163,260	2.07
Cass	100,376	171,910	1.97
Clay	227,577	358,420	1.64
Boone	168,535	263,150	1.60
Lincoln	53,354	79,870	1.45
Newton	59,069	86,110	1.36
Taney	52,956	76,300	1.31
Greene	280,626	397,020	1.25

⁶ "Hours of Service of Drivers, Final Rule." *Federal Register* 76 (27 December 2011): 81134-81188. Web: <http://www.fmcst.dot.gov/rules-regulations/administration/rulemakings/final/HOS-Final-Rule-12-27-11.pdf>

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St. Charles	368,666	517,450	1.22
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Source: Woods and Poole Economics

Missouri follows national trends of population growth in and around urban counties with less or negative growth in rural counties. By 2040, Missouri population is estimated to be over 7 million people. **Table B-10** identifies the ten most populous counties in 2040. Similar to the projected fastest growing counties, the estimated top 2040 county populations are near St. Louis, Kansas City, Columbia and Springfield.

Table B-10: Highest Projected Population by County

County	2012 Population	2040 Population	Annual Growth Rate
St. Louis	1,000,438	1,050,850	0.18%
Jackson	677,377	682,610	0.03%
St. Charles	368,666	517,450	1.22%
Greene	280,626	397,020	1.25%
Clay	227,577	358,420	1.64%
Jefferson	220,209	295,380	1.05%
Boone	168,535	263,150	1.60%
St. Louis City	318,172	246,080	-0.91%
Cass	100,376	171,910	1.97%
Platte	92,054	163,260	2.07%

Source: Woods and Poole Economics

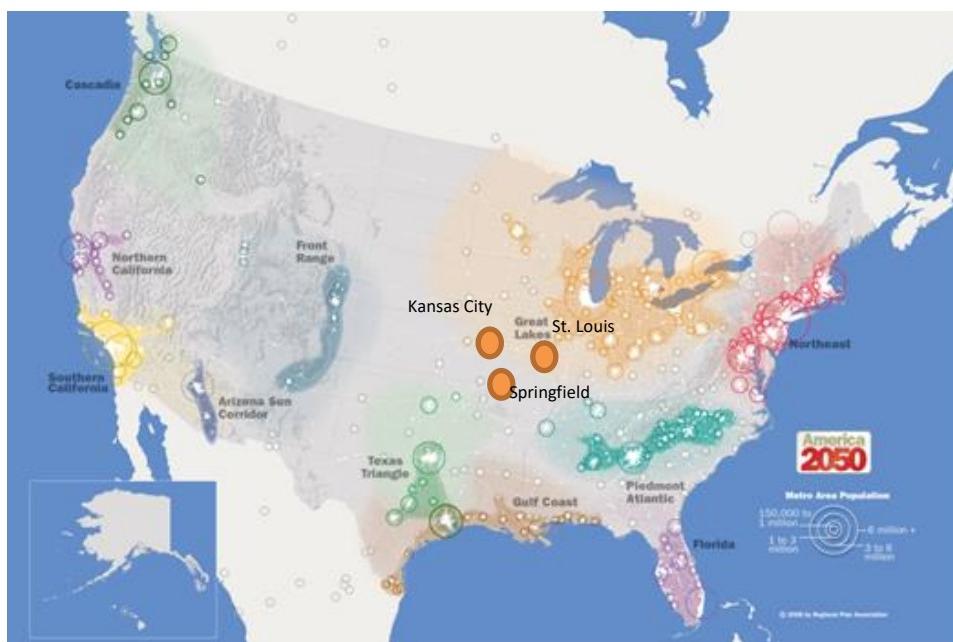
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Mega-Regions

Attention has been given to the concept of mega-regions as geographers, planners, and economists have realized that mega-regions, rather than particular cities, states, or nations, are the real driving force in the world economy.

Ten mega regions in the United States have been identified by America 2050 in their "America 2050: A Prospectus".⁷ These mega-regions (**Figure B-9**) are where, by mid-century, "more than 70 percent of the nation's population growth and economic growth is expected to take place," with an increased movement of goods, people and capital between those regions. As these mega-regions increase their roles in the national and global economy, pressure and increased congestion for ports, highway facilities, railroads, intermodal yards, and other freight facilities will only increase. While specific area delineation differs, by one count, mega-regions in the United States account for only 30 percent of the geographical area, but 77 percent of both population and employment, 81 percent of gross regional product, and 92 percent of Fortune 500 Companies' revenue (all 2008).⁸ Effective freight planning will take into account not only movement within each of these mega regions, but also freight movement from one mega-region to other mega-regions.

Figure B-9: Emerging Mega Regions



Source: America 2050

The northern portion of Missouri falls within the Great Lakes mega region. Kansas City, St. Louis and Springfield are the closest cities to the western and southern mega regions, providing excellent opportunities as a trade center between these other mega regions.

⁷ America 2050 Prospective, page. 4.

⁸ Ross, C., & Woo, M., "Megaregions and Mobility." *The Bridge*. National Academy of Engineering. Vol 41, No 1 Spring 2011: 27-34

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Infrastructure Preservation

This section highlights the infrastructure maintenance needs on the aging freight network. The maintenance of the nation's waterway lock and dam infrastructure and highway/bridges are important factors in providing an efficient freight system.

Port and Waterway Maintenance

The lock and dam network, under the jurisdiction of the U.S. Army Corps of Engineers, was implemented to control the river levels and to maintain a minimum nine-foot-deep channel on the upper Mississippi River for more reliable navigation. With the exception of Lock and Dam 26 (Melvin Price), which was opened in the 1990s, the majority of the locks and dams were constructed in the 1930s and are showing their age. The locks and dams are in need of major rehabilitation or replacement which is an expensive undertaking. Replacement may be the most economical option as many of the locks are undersized for today's larger barge tows.

The seven locks and dams in or near Missouri are part of the Upper Mississippi River starting just north of St. Louis to the Iowa Border and listed in **Table B-11**. The Lower Mississippi River (south of St. Louis) and the Missouri River contain no locks or dams.

Table B-11: Upper Mississippi Locks and Dams in or Near Missouri

Lock/Dam Number	Location
No. 20	Canton, MO
No. 21	Quincy, IL
No. 22	Saverton, MO
No. 24	Clarksville, MO
No. 25	Winfield, MO
No. 26 (Melvin Price)	East Alton, IL
No. 27 (Chain of Rocks Dam)	Glasgow Village, MO
No. 27 (Chain of Rocks Lock)	Granite City, IL

Source: U.S. Army Corps of Engineers

The maintenance needs of the aging infrastructure are increasing at a rate much greater than the operations and maintenance funding provided for the system which adversely affects reliability of the system. Long-established programs for preventive maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors. Replacement may be the most economical and feasible option as many of the locks are undersized at 600 feet and cannot accommodate the standard 15-barge tow configuration which is 1,200 feet. This causes operators to have to run smaller configurations or break down the barges, adding time to a shipping method that is already slower than others.

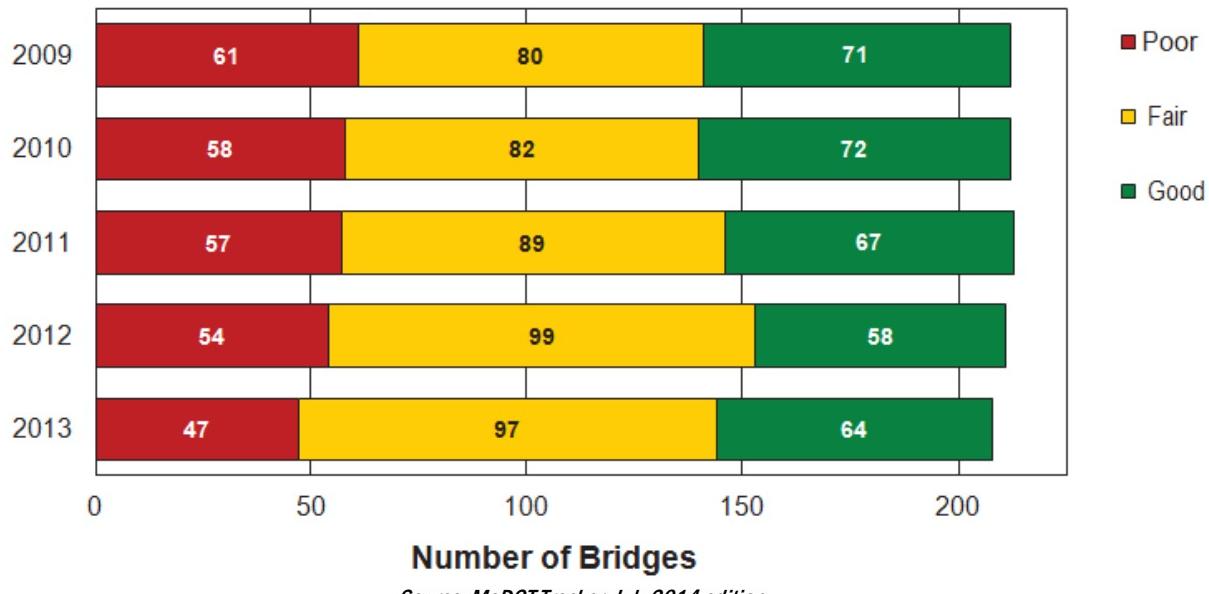
Highway and Bridge Maintenance

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Missouri has more than 33,000 miles of highways and 10,000 bridges to maintain. Currently more than 89 percent of Missouri's major highways are in good condition which is ahead of the 85 percent target set by Missouri. Despite significant investment in Missouri major bridges, which have resulted in decreasing number of structures in the poor category, the number of structures in the good category also decreased. Missouri has 208 major bridges. A major bridge is defined as one that crosses a river or lake and is 1,000 or more feet long. Major bridges are very expensive to rehabilitate and replace. A simple rehabilitation typically costs over \$10 million while major bridge replacements can reach into the hundreds of millions of dollars. Major bridge conditions by year are shown in **Figure B-10** below.

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Figure B-10: Statewide Condition of Major Bridges (208 Total Bridges)



Logistical Challenges

There are a number of logistical challenges facing shippers in Missouri and throughout the Midwest. There are two key direct cost challenges facing shippers. They include the variability of rates as they relate to the variability of fuel costs and truck driver availability. Similar to truck drivers, the availability of truck and rail equipment is an issue shippers are facing. As a result of limited containers and chassis, coordinating equipment movement to assure the necessary volume of chassis and containers are at the same location when they are needed is crucial.

Recently some shippers have had to change container service providers as a result of recent mergers and consolidation alliances. This results in adjustments to processes, reporting and logistical coordination. In addition, shippers must adjust to changes related to content identity and preservation. This is especially true with bulk commodities that will lose their unique characteristics if comingled during storage, handling or shipping. For example, maintaining and preserving organic-raised commodities from traditionally raised commodities is a new challenge.

The challenges facing shippers mentioned above are all in addition to the ongoing challenges of handling growing volumes and the pressures of on-time delivery.⁹

Technology

⁹ Global, National Impacts on Heartland Logistics, Paul Bingham presentation at Heartland Shippers Conference, May 13, 2014

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Today technology is often associated with advanced electronics, but traditionally technology is more broadly defined as the application of *knowledge to the creation and use of technical means and their inter-relation with life, society and the environment.*¹⁰

As freight volumes have dramatically increased across the U.S. during the past several decades, concepts for dedicated freight infrastructure, such as dedicated truck lanes, have increasingly entered the transportation discussion. Dedicated truck lanes physically separate commercial vehicles from passenger vehicles or mixed traffic flows. In recent years a number of states, including California, Florida, Georgia and Texas, have examined dedicated truck lane concepts, as have a number of multistate corridor coalitions such as I-70 and I-10. **Figure B-11** shows an example of a dedicated truck lane. While highway lanes dedicated to commercial vehicles may not seem like advanced technology, separating vehicle streams introduces a new level of complexity in highway design (i.e. on/off ramps) and operations (dealing with incidents or breakdowns).

Missouri has investigated and studied dedicated truck lane opportunities on I-70 in two different efforts. The studies included the I-70 Corridor Environmental Impact Statement (EIS) across the State between the eastside of Kansas City area to the west side of the St. Louis area. Missouri also participated in the I-70 Corridors of the Future planning as one of the four states investigating truck only lanes through Ohio, Indiana, Illinois, and Missouri.

Figure B-11: Example of Dedicated Truck Lanes



To date, few examples exist of operating dedicated truck facilities, and those that do exist tend to be relatively short routes serving ports or key border crossings. The concept of long-distance truck lanes is frequently tied to tolling as the means of raising revenue to support construction. The trucking industry has expressed strong opposition to tolling truck lanes due to high administrative costs compared to traditional fuel taxes and the reluctance or refusal of shippers to reimburse carriers. Some dedicated truck lane concepts would also force trucks off infrastructure constructed in part with taxes and fees already paid by the industry. Benefits associated with dedicated truck-lanes include significant safety gains, the potential of adopting high productivity vehicle (HPV) configurations and the possibility of infusing advanced technologies that fall under the umbrella of Intelligent Vehicle Initiatives (IVI). HPV

¹⁰ Dictionary.com <http://dictionary.reference.com/browse/Technology>

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configurations such as heavier trucks with more axles or longer combination vehicles (LCVs) have been proposed as one means of offsetting the costs of tolls often associated with dedicated truck facilities.

Freight Shuttle System

The Texas A&M Transportation Institute (TTI) has been advancing the concept of an elevated structure dedicated solely to the transport of freight called the Freight Shuttle System (FSS) shown in **Figure B-12**. In this concept, autonomous transporters would carry truck trailers or containers along an elevated guideway designed to be located along the median of an existing right-of-way, usually a freeway or highway. The transporters would use electrically powered linear induction motors that are efficient and do not add emissions on site; guideway construction uses a technique requiring no road closures.¹¹

¹¹ "The Freight Shuttle System: A 21st Century Solution to Freight Transportation Challenges." Texas A&M Transportation Institute. Web. 5 Sep. 2013. <<http://tti.tamu.edu/freight-shuttle/>>.

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Figure 12: Freight Shuttle System Autonomous Transporter and Guideway



Source: TTI

The pilot location proposed for implementation of the FSS is Juarez, Mexico to El Paso, Texas, a distance of 11.7 miles. Freight Shuttle International (FSI) has signed a letter of intent with the City of El Paso, the City of Ciudad Juarez, and the Regional El Paso Economic Development Corporation to privately finance and build the project.^{12¹³} If and when it is completed, the FSS could change the dynamic of short- and medium-range freight shipments by reducing congestion and deterioration of roads, increasing import and export capacity, and easing the infrastructure burden on public tax dollars.

As vehicle research and technology continues to explore autonomous vehicles, driverless vehicles are still likely many years away. However, the use of vehicle-to-vehicle and vehicle-to-infrastructure communication to 'train' or platoon groups of vehicles is likely to be seen sooner. Sensor communication between vehicles will adjust the vehicle speed to prevent collisions. Freight and passenger vehicles will benefit from a reduction in congestion related to crashes, reduced operating costs, and more reliable travel times.

Likewise, the Rail Safety Improvement Act of 2008 mandates that Positive Train Control (PTC) be implemented across a significant portion of the nation's rail industry by December 31, 2015. PTC is advanced technology designed to automatically stop or slow a train before accidents occur.

¹² The El Paso Regional Economic Development Corporation (REDCO) merged with the Paso del Norte Group to form the Borderplex Alliance in early 2013.

¹³ Crowder, David. "Freight shuttle for border bridges." El Paso Inc. 23 12 2012, Web. 5 Sep. 2013. <http://www.elpasoinc.com/news/top_story/article_9f741ea4-4d1b-11e2-bd13-0019bb30f31a.html?mode=story>.

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E-Commerce Delivery

E-Commerce in the U.S. increased from 0.6 percent of total retail activity in 1999, to 5.5 percent in the first quarter of 2013. The rapid increase of E-Commerce and related increase to direct home delivery has impacted the freight network. Similar to traditional retailers such as Wal-Mart and Target that have implemented a series of distribution warehouses as part of their supply chain management and to facilitate just-in-time delivery, e-retailers such as Amazon and eBay have constructed a series of centralized distribution centers. E-commerce requires fast, on-time delivery, which is sensitive to both distance and congestion. These distribution centers help the e-commerce retailers achieve next-day or even same day delivery for their products.

Common to this trend is the higher penetration of parcel delivery vehicles into residential neighborhoods delivering products ordered online. According to the 2007 Commodity Flow Survey, the value of freight shipped by parcel, U.S. Postal Service, or courier, increased from 11.8 percent of total freight by value in 2002 to 13.4 percent in 2007. As residential deliveries increase, planners fear an increase in related congestion and wear and tear to the local road network as this form of freight traffic disperses from major arterial networks into local neighborhoods. The short temporary parking requirements of delivery vehicles will need to be considered as state and local governments implement "Complete Streets".

Energy

Natural gas, as compressed natural gas (CNG) and liquefied natural gas (LNG), is the fastest-growing fuel in the transportation sector, with an average annual growth rate of 11.9 percent from 2011 to 2040.¹⁴ Heavy duty vehicles (HDVs)—which include tractor trailers, vocational vehicles, buses, and heavy-duty pickups and vans with a gross vehicle weight rating (GVWR) of 10,001 pounds or more—lead the growth in natural gas demand throughout the projection period.¹⁵ However there is an initial high total cost to retrofit or replace existing equipment. If trucking companies elect to make the switch, they will first need public LNG fuel stations every 400 miles on major truck corridors before adopting alternative fuels for their fleets.

Natural gas prices remain comparatively lower than other countries in 2014, which provides enormous competitive advantage to the nation's energy-intensive industries. As companies invest to capitalize on lower energy costs, heavy manufacturing is likely to grow and outbound rail and waterway freight transportation is a key to siting plants.

If global conditions do not change, the price of diesel fuel is likely to remain stable or increase. The diesel fuel used in extracting oil and natural gas from shale rock formations sets a price floor for diesel. The outlook for natural gas is similar, as low natural gas prices lead to a corresponding drop in shale gas drilling due to less profitability, which in turn reduces supply, and less supply tends to raise prices.

Container-on-Vessel

¹⁴ U.S. Energy Information Administration. Web June 20, 2014. <http://www.eia.gov/forecasts>

¹⁵ U.S. Energy Information Administration. Web June 20, 2014. <http://www.eia.gov/forecasts>

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Port authorities, government agencies and shippers look to the feasibility of container-on-vessel (COV) service to enhance existing truck and rail transport. COV is cost-effective for shippers in unit, operation and labor costs when compared to rail and truck. Potential obstacles to greater use of COV in Missouri include: readiness of ports, delivery requirements for ports to sustain service, and inefficiencies in backhauling empty containers. Most port authorities don't currently provide containerized cargo.

Initiation of COV service depends on the development of partnerships between key port operators and shipping stakeholders. According to "Missouri Public Port Authorities: assessment of importance and needs," all current port facilities, with limited capital investments, could operate as a COV facility.

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Needs Input

In an effort to identify needs and issues affecting the efficient movement of freight in Missouri, information from a variety of sources was gathered and analysis was performed. In order to identify needs it is important to understand the current conditions of the freight system, which provides us with a snapshot of how freight moves today. The key inputs into identifying needs include: regional freight plans, stakeholder input, freight transportation system assets inventory and assessment, and analysis of the conditions and performance of the State's freight system.

Regional Freight Plans

Both the Kansas City and St. Louis metropolitan areas have regional freight plans in place. The Kansas City Regional Freight Outlook and the St. Louis Regional Freight Study both provide a forecast of growth in freight movements in Missouri on regionally defined freight networks. Each plan highlights improvement recommendations and needs in each region.

Kansas City Regional Freight Outlook

The Kansas City Regional Freight Outlook was produced in 2009 with the following regional objectives.

- Improve goods movement system performance
- Support transportation and logistics business attraction and retention
- Contribute to ensuring the region's quality environment

The plan focused on a number of critical actions to complete over a three- to five-year period, which covered through 2014. As a result, many of the recommendations have already been completed.

St. Louis Regional Freight Study

The St. Louis Regional Freight Study was completed in 2013 and identified strategic links to address connections between freight modes. These strategic links are:

- Water to Rail
- Truck to Water to Rail
- Rail to Rail (Intermodal)
- Repurpose Old Industrial Sites

The study noted some specific modal project recommendations and needs in the region. Rail improvement needs include rebuilding the western approach to the Merchants Bridge, adding a third mainline track from Grand Avenue to the MacArthur Bridge, and double-tracking the BNSF rail line under I-44. Trucking needs include additional capacity on the I-270 New Chain of Rocks Bridge, improved route signing for through trucks, ITS improvements to relay real time bridge congestion, and monitoring of truck heavy intersections and arterials near intermodal yards. Waterway modal

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recommendations include exploring container-on-vessel opportunities, reusing old riverfront sites for higher value manufacturing activities, and working with the private sector to move from high volume transload terminals toward more unit train capacity terminals. The study did not mention any project needs related to the air cargo services at Lambert-St. Louis International Airport.

Stakeholder Input

Due to the unique character and diversity of the freight industry, representation from the providers and users in all modes of the freight transportation system were necessary. This diverse group provided an opportunity to help identify key issues and opportunities in the freight system. To ensure adequate and appropriate engagement with the freight community, a variety of tools were utilized, including freight stakeholder interviews; motor carriers, shippers, and receivers surveys; and district freight forums and webinars. The following sections discuss the information gathered from the stakeholder involvement process to date, with continuing outreach efforts to follow.

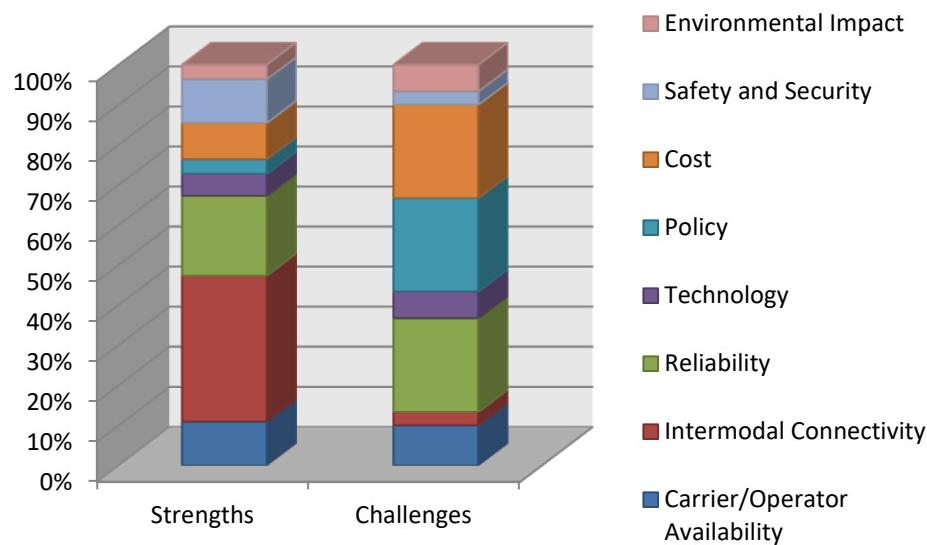
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Freight Stakeholder Surveys

The purpose was to solicit input, ideas, perceptions, concerns, and attitudes; and to identify key issues related to freight movement throughout the state.

A wide range of freight stakeholders, including trucking companies, railroads, and port authorities completed the survey. In total 31 surveys were completed, 21 (68 percent) of which were completed by representatives of the transportation and warehousing industry. Respondents of the survey indicated that the availability of several modal choices is the greatest strength of Missouri's freight system and reliability, policy, and cost are the greatest challenges. **Figure 13** shows strengths and challenges that were identified.

Figure 13: Strengths and Challenges Identified by Freight Stakeholders



In addition, respondents to the survey were asked where they would spend money to improve the freight transportation system. Respondents provided a variety of answers to this question, the most frequent being:

- Improve the locks and dams
- Improve and expand port facilities
- Increase dredging
- Increase highway and railroad capacity
- Improve intermodal connectivity

Motor Carriers, Shippers, and Receivers Surveys

The Missouri Department of Transportation (MoDOT) began engagement efforts for the State Freight Plan in December 2013, targeting key business and community stakeholders. MoDOT identified 96 contacts in freight-related services including manufacturing, economic development, logistics, and carriers. An email invitation announcing the project was distributed with the Plan fact sheet to familiarize stakeholders with the launch of the Plan and the consultant team followed up with phone

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interviews. In total, 53 interviews were conducted. The statewide themes heard by the stakeholders include:

- Missouri is a “crossroads for the continent”. Missouri’s central location in the United States was consistently identified as a top strength of the state’s freight system and an asset for attracting new business. The state utilizes all of the different freight modes, and many stakeholders considered freight diversity to be another strength of the network, as long as all of the options are working together. Cooperation between modes is reported to be “relevant nationally”.
- Interviewees’ freight needs focused on Interstates and railroads. Across all freight services, discussion centered on trucks and rail. Although I-70 does not pass through every district, the majority of stakeholders indicated capacity upgrades from Kansas City to St. Louis are needed to maintain network reliability. Several other Interstate routes, including I-44, were also mentioned as key corridors for continued investment. Manufacturers also heavily utilize rail and want to see this mode continue to operate efficiently, but understand the challenge of planning for an asset that is owned and operated by private entities.
- An opportunity exists for ports to provide increased capacity and alleviate congestion in other modes, but ports require additional investment. Several stakeholders see potential for growth on the Missouri and Mississippi Rivers, but consistently brought up concerns including infrequent dredging and lack of improvements to the lock and dam system. The Panama Canal expansion was also mentioned by some stakeholders who want to make sure the state is positioned to take advantage of increased freight flow
- Stakeholders were interested in public-private partnerships to fund freight infrastructure improvements and incentives to attract new business. Business and community leaders were also asked what strategies Missouri could utilize to promote freight transportation. “Competing states are bringing resources to the table” was mentioned several times, and interviewees want Missouri to be in a position to remain competitive. Many stakeholders indicated cost-sharing initiatives with private freight networks and providers (rail, waterways, pipelines) would enhance economic development and that public freight networks (roads) should pay for roadway maintenance and capacity upgrades. Stakeholders across all freight services were concerned about the availability of funds for future investment.

District Freight Forums and Webinars

Seven district freight forums were held throughout the state. The purpose of the forums was to ensure that the perception of the freight trends, needs, and issues are understood and to expand the dialogue that was started as part of MoDOT’s long range transportation plan. **Table 12** lists the date and location of each forum that was held. Around 150 stakeholders participated in the District Freight Forums. Due to weather, the Hannibal in-person forum was cancelled and a webinar was held to present the information and receive input.

Table 12: District Freight Forums

District	Date	Location
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Central	January 29, 2014	Jefferson City
Northwest	January 30, 2014	St. Joseph
Kansas City	January 31, 2014	Kansas City
Northeast	February 4, 2014	Hannibal
St. Louis	February 6, 2014	Chesterfield
Southwest	February 7, 2014	Springfield
Southeast	February 25, 2014	Sikeston

Recurring themes heard during the forums from across the state include:

- Missouri generally has a well-connected and functioning road network until there is a hiccup, such as congestion, weather, or construction. Stakeholders also identified a need for capacity and maintenance improvements to maintain reliability of Interstates and minor routes.
- I-70 is a vital transportation link for the State and needs to be improved across the State.
- Missouri is a “crossroads for the continent” and has a vast freight network that is an asset for retaining existing businesses and attracting new business. Stakeholders voiced concern that not all modes are readily accessible and well connected with other modes (e.g. rail to water ports) and that work needs to be done to integrate the freight modal networks.
- There is a need to engage additional stakeholders to help guide the freight plan. Previous efforts have lacked private sector engagement. Over the last several years MoDOT has collaborated with several private sectors groups on successful projects. This is an opportunity to build on those relationships, share information, and continue to collaborate.
- Investigate possibilities for utilizing waterways. Stakeholders see potential for growth on the Missouri and Mississippi Rivers but consistently brought up concerns including frequency of dredging, lack of improvements to the lock and dam system and inconsistent water levels. The expansion of the Panama Canal was also mentioned by stakeholders who want to make sure the state is positioned to take advantage of potentially increased freight flow and remain competitive. Stakeholders are concerned about low water levels and the impacts to operations if dredging frequency decreases.
- Appropriately funding freight transportation projects is a key stakeholder concern. Stakeholders voiced a need to preserve the existing freight network and systems, but also said that improvements and enhancements are key to growing the state’s economy.

The following sections provide a summary of the three to six key issues heard during each of the district forums.

Central

The following are the key items that were discussed during the Central District forum.

- Innovative funding options should continue to be explored. Stakeholders in this district are concerned that funding gaps are threatening programs that are working well, such as MoDOT's cost share program.

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- Efforts should be made to improve connectivity throughout the district. Stakeholders identified a need for improving north-south connections and specifically noted concerns with US-63 between Jefferson City and Rolla. The district could also benefit from improvements to I-70, such as increased lanes, as the Interstate is critical to moving freight and supporting the agriculture industry. Several stakeholders suggested that a multi-modal hub between Columbia and Jefferson City would support economic development in the district.
- The Missouri River is underutilized and under-marketed. Stakeholders recognize that the district should expect increased demand over the next five years and beyond. Utilizing waterways will be critical in effectively moving additional freight and taking strain off of highways and rail lines.
- The freight system needs to support the agriculture industry, which is key to the economic success of the district and the State. As one stakeholder noted, "2014 ag industry technology is being moved on a 1940's (freight) network."

Northwest

The following are the key items that were discussed during the Northwest District forum.

- Farm-to-market routes are essential to the region's economy. Rail access in this region is decreasing, so lettered routes are very important, not only for moving agriculture goods, but also as connections for manufacturers to highways and Interstates.
- Road capacity upgrades are important in the region. Despite I-70 passing outside of the district to the south, stakeholders indicated that it should be improved to a six-lane facility. Stakeholders also suggested increasing capacity to four lanes between I-29 and I-35 through Maryville.
- US-36 is an important corridor for business owners and should be considered for Interstate designation. One private truck freight fleet operator called US-36 a "national best-kept secret." He explained that it is a safer route and that it saves his drivers an hour in drive time to Indianapolis.
- There is a dwindling rail presence in the district. Stakeholders pointed out that there were more freight rail options in the past and many of those options no longer exist in the district.
- Economic development efforts, such as the Eastowne Business Park in St. Joseph, need adequate roadway access. In addition, food industry businesses, such as Farmland Foods, could benefit from investment in intermodal access.
- Low water levels and water quality in the district and throughout the State concern stakeholders, as does local port funding.

Kansas City

The following are the key items that were discussed during the Kansas City District forum.

- The Kansas City community is proud of its status as one of the largest rail freight and trucking hubs in the country. Stakeholders commented that integrating different freight modes is important regionally and nationally. Assets in this district include a rapidly growing Foreign

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Trade Zone and the BNSF multi-modal facility located across the state line in Kansas, which will have the largest speculative space in the country.

- Capacity upgrades to I-70 are a top priority in the Kansas City District as well as across the State. The importance of the I-70 corridor to freight movement is echoed throughout all of the districts. Additional lanes were suggested to provide better reliability along the corridor. Other top priority corridors identified included I-44 and the south leg of I-435.
- Private sector engagement is a crucial part of crafting a meaningful freight plan. Stakeholders suggest that key businesses, including railroads, should be brought into crafting the plan and that the best way to do that is through cultivating relationships and building trust. In addition, information on private sector freight movements that has not been available in the past is needed for a complete freight picture and a plan that enhances economic development in the State.
- The increase in the use of e-commerce is changing the way that freight stakeholders conduct business and will require a freight system that accommodates that shift. Stakeholders pointed out that more distribution centers will lead to greater pressure on roadways.

Northeast

The following are the key items that were discussed during the Northeast District forum.

- Capacity expansion and maintenance of highway networks are essential to ensuring network reliability. Specific examples of maintenance issues provided by stakeholders included US-36 from Shelbina to Hunnewell and Monroe City and along US-61 between Palmyra and Hannibal. Road surfaces in many sections are “rougher than a cob.” Capacity issues include too much truck traffic on I-70, and bottlenecking on US-61 in Hannibal and on the I-70 interchange in Warrenton.
- Future growth is threatened by railroads closing local crossings and spurs and removing scales in this district.
- Locks and dams along the Mississippi River need improvement. Port stakeholders in this region mentioned the deteriorating condition of the lock and dam system as a challenge for Missouri freight in the future.

St. Louis

The following are the key items that were discussed during the St. Louis District forum.

- St. Louis is challenged to compete as a freight hub, and focus should be placed on developing opportunities for intermodal activities and international export. Stakeholders said transforming St. Louis to a major freight hub status is needed to grow the regional economy. While “St. Louis tends to be a pass-through,” there are opportunities to develop additional facilities, particularly as an alternate freight hub to Chicago, which is highly congested. Stakeholders would like the public to be better informed on how freight transportation infrastructure supports the economy and jobs.
- Congestion on I-70 and I-44 causes costly delays and some safety concerns.

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- It is difficult to move freight from ports and airports directly to destinations. Better connectivity is needed between the freight modes. Stakeholders are concerned about the difficulty businesses have in making the “last-mile connections.” This issue was recently raised when trying to attract large economic development deals to the region.
- Air cargo facilities are available at Lambert Airport, but they are dated and small.
- Deficient bridges in the district could cause costly delays and pose safety concerns for carriers.
- There is a shortage of available motor carriers and truck fleets as it is becoming increasingly difficult to recruit and insure drivers, and many fleets have left St. Louis. These shortages are driving up costs to move freight on roadways.

Southwest

The following are the key items that were discussed during the Southwest District forum.

- Interstate capacity upgrades are needed. Many stakeholders suggested adding lanes to I-70 and I-44. “I-44 is aging out and will need additional capacity as the population increases in the region.” Congestion on these Interstate corridors is a top concern for many, especially in urban areas. One stakeholder recommended completing I-49 to the Arkansas state line.
- Motor carrier accommodation and recruitment is a high priority in this district. A recurring theme from stakeholders is the need for better accommodations for motor carriers, such as improved and larger rest areas. In addition, stakeholders are interested in motor carrier recruitment, driver training programs for the general public to increase safety on roadways, and less regulation on drivers.
- Funding programs for freight should be flexible so each district can target their specific needs, regardless of mode.

Southeast

The following are the key items that were discussed during the Southeast District forum.

- East-west connectivity is limited regionally and a St. Louis bypass could help congestion. Capacity concerns in the St. Louis area led many stakeholders to suggest an east-west or diagonal corridor to provide “this area a direct route through central Missouri” as an alternative to the longer I-55/I-70 route. Another interviewee said Missouri “needs an ‘X’ through the middle of the state to connect southeast Missouri with Kansas City and Kirksville to Joplin and Springfield.” Stakeholders also suggested a freeway-type roadway (i.e. four-laning US-60 across the state).
- US-67 is a key north-south connection, and completing the route through Arkansas would increase economic opportunities.
- Industry relies on secondary highways for time-sensitive delivery and connections to Interstates, and the condition of these roadways could be improved. Several stakeholders suggested resurfacing and capacity upgrades.

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- Stakeholders are concerned about funding for ports and waters for small-level capital projects. Additionally, several stakeholders commented about the need for consistent support of dredging.

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Needs Identified

Based on the results of the tasks discussed in the previous sections, this section identifies the key freight system needs. Through the analysis of these tasks, 28 general freight network needs were identified. The needs identified are discussed below by mode of freight transportation and fall into one of six categories: system capacity, system operations, freight network, safety, connectivity, and policy regulations.

Highway

The freight system needs identified for the highway mode of transportation include needs falling under five of the six categories listed above. The identified freight system highway needs are:

- Improved potential corridor capacity.
- There are bottlenecks throughout the State at a number of locations on the highway network. These bottlenecks can be caused by capacity issues, as well as geometric issues. Improvements are needed to eliminate these bottlenecks. The improvements will be dependent on the cause of the bottleneck. Bottlenecks could be both a capacity and operations issue. **Figure 2** in Section 2 Trends and Issues of this report shows the Top 100 bottlenecks in Missouri.
- Safety is a major focus of both public and private sector freight stakeholders. Key safety needs include: the lack of safe truck parking, numerous at-grade rail crossings, and roadway design and geometrics improvements to facilitate safety.
- Major freight generator sites have been identified throughout the State. Connectivity to these sites is a key need, including the last mile connections.
- Missouri does not currently have a designated freight network. A designated freight network is needed for all modes of freight transportation, including highways, and will be produced as part of the State Freight Plan.

Rail

The freight system needs identified for the rail mode of transportation include needs under each of the six categories listed above. The identified freight system rail needs are:

- There are congestion and capacity issues on numerous rail lines throughout the State. Improvements to the rail lines with congestion and capacity issues are needed.
- A bottleneck at the intersection of rail lines in the Kansas City area currently exists. Coordination with the rail companies that own these rail lines and a solution to eliminate this bottleneck is needed.
- At-grade rail crossings throughout the State present a safety issue. Improvements at all at-grade rail crossings with safety issues are needed.

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- In the Northwest and Northeast Districts, short line rail lines are being removed and hindering economic development in these areas. Coordination with the short line rail companies is needed and a different solution than removal of rail lines is needed.
- At the Howard/Cooper Regional Port and Mississippi County Port, rail access to and from these ports is needed.
- There are two bridges across the Mississippi River in St. Louis and both are in poor condition. So while there is redundancy in the system the condition of the bridges presents a problem. The condition of both of these bridges needs to be improved.
- Currently because of a regulatory and inspection issue all refrigerated goods must be shipped through Kansas City, no matter the goods final destination. A proper inspection facility to meet the regulations is needed in St. Louis to eliminate the need to ship all goods through Kansas City.
- Missouri does not currently have a designated freight network. A designated freight network is needed for all modes of freight transportation, including rail.

Air

The freight system needs identified for the air mode of transportation include needs under three of the six categories listed above. Needs related to system operations, freight network, and policy regulations were identified for the air mode. The identified freight system air needs are:

- The cargo facilities at the St. Louis Airport (STL) are limited and outdated. These facilities need updated and expanded.
- The safety and perimeter security at the Kansas City International Airport (MCI) is in need of additional and improved fencing and gates. These security measures need to be updated and expanded. The Springfield Airport (SGF) has been identified has an airport that may have its tower hours reduced. The tower hours at SGF should not be reduced.
- Missouri does not currently have a designated freight network. A designated freight network is needed for all modes of freight transportation, including air.

Water

The freight system needs identified for the water mode of transportation include needs falling under four of the six categories listed above. No needs related to safety or connectivity was identified for the water mode. The identified freight system water needs are:

- At ports throughout the State increased maintenance activity is needed on both the land and water sides of the operations.
- Upgrades and rehabilitation are needed on many of the locks and dams in the State. Coordination with the US Army Corps of Engineers will be needed in order to do so.

Appendix B: Trends, Needs, and Issues

- Missouri's position is the Missouri River water flow needs to maintain navigation depth for the entire shipping season along the entire river. This plan and its elements should support the State's position.
- Numerous emerging ports have been identified throughout the State. Support for their development is needed.
- Missouri does not currently have a designated freight network. A designated freight network is needed for all modes of freight transportation, including water.

Pipeline

The freight system needs identified for the pipeline mode of transportation include needs under three of the six categories listed above. Needs related to system capacity, freight network, and policy regulations were identified for the pipeline mode. The identified freight system pipeline needs are:

- More pipelines across the State are needed to meet the demands of the energy sector activities.
- Missouri does not currently have a designated freight network. A designated freight network is needed for all modes of freight transportation, including pipeline.

Intermodal

The freight system needs identified for intermodal facilities include needs falling under four of the six categories listed above. No needs related to system operations or safety was identified for intermodal facilities. The identified freight system intermodal needs are:

- New intermodal connection points are needed.
- Improved intermodal connection ports are needed to ports across the State.
- Last mile intermodal connections are needed.
- Missouri does not currently have a designated freight network. A designated freight network is needed for all modes of freight transportation, including intermodal facilities.

Financing

The majority of Missouri transportation funds come from the gas taxes which have not been raised since 1992 and are constitutionally limited to State roads and bridges. This has put a severe strain on the transportation sector to find alternative funding sources. There is need to identify innovative and alternative funding sources. Missouri has one of the lowest state fuel taxes in the nation. This, coupled with Missouri having the seventh largest state highway system in the United States, which is made up of approximately 33,700 miles of roadway, has created project funding challenges for the leaders of Missouri. Missouri port authorities have no sustained, dedicated, reliable funding sources.

Conclusions

The purpose of identifying major trends and issues likely to impact freight transportation in Missouri in the foreseeable future is to provide additional information about the future that traditional forecasting

Appendix B: Trends, Needs, and Issues

techniques would likely overlook. Looking at several trends to track and monitor issues with the potential to have the greatest impact on freight in Missouri, such as infrastructure preservation and logistics, will enable MoDOT to plan and respond more effectively and create a transportation system prepared for the future.

Appendix C-

STRENGTHS AND

CHALLENGES

TECHNICAL MEMO

Appendix C: Strengths and Challenges

Strengths and Challenges

This Strengths and Challenges of the State's Freight System Technical Memorandum discusses the strengths of Missouri's freight system and its most important challenges to solve. In addition, it discusses the Missouri State Freight Plan goals and objectives and how they are or are not currently being met.

The Strengths and Challenges for Missouri's freight system are discussed by the same four categories that the key freight needs were categorized by in [Appendix B](#).

Introduction

This technical memorandum was prepared for the Missouri State Freight Plan to identify the State's competitive advantages and the most important challenges to solve. In addition, it discusses components of the freight system that do not meet State goals and objectives as defined in Appendix E.

The Moving Ahead for Progress in the 21st Century Act (MAP-21) requires that a state freight plan include an analysis of the strengths of the State's freight system that should be maintained and the challenges to be solved. This analysis shows the strengths of the State's freight system that Missouri wishes to build upon; it also shows the State's freight system components that do not meet the State's goals, and identifies which challenges are most important for the State to address. Some of these might include challenges that the State expects to face in the future as a result of increasing demand for freight transportation, lack of funding, or other trends that the State is anticipating.

The strengths and challenges of the State's freight system are discussed within four categories: System Capacity, System Operations, Safety, and Connectivity.

It should be noted that the Missouri Department of Transportation's (MoDOT's) freight system strengths cannot be maintained without adequate funding. In addition, those items identified as challenges will likely worsen as funding decreases.

Strengths and Significant Challenges of the Freight System

System Capacity

Appendix C: Strengths and Challenges

This section discusses the strengths and challenges to the State's freight system. These strengths and challenges are addressed in the context of congestion, bottlenecks, and other capacity-related issues on the system.

Strengths

- Missouri has the seventh largest State highway system in the country, but is only the 21st largest state by size and the 18th largest by population, with 33,700 centerline miles of roadway, 5,500 of which are classified as heavily traveled "major highways" and 28,200 miles of which are defined as lesser traveled "minor highways". Missouri's major highways or principal arterials encompass just 20 percent of the State highway miles but carry 80 percent of the system's traffic. There are 18 Interstate Highways within Missouri, including nine main routes and nine auxiliary routes. Freight stakeholders believe Missouri generally has a well-connected and functioning road network, which is a strength for the State that needs to be maintained and built upon.
- Since 2009, the U.S. Department of Transportation has designated several marine highways for transporting cargo on water, reducing pollution, and limiting congestion on roads. Maritime highways serving Missouri include M-29 covering the Upper Missouri River from Kansas City to Sioux City, Iowa; M-70 covering the Missouri River from Kansas City to St. Louis; M-55 covering the Mississippi River from St. Louis to the Gulf of Mexico; and M-35 covering the Mississippi River from St. Louis to the Twin Cities. This is important to Missouri because designated marine highways receive preferential treatment for federal assistance from the U.S. Maritime Administration, which Missouri can take advantage of.
- Missouri is home to three of the top 106 cargo airports in North America in terms of 2013 total tonnage; Kansas City International (MCI), Lambert-St. Louis International (STL), and Springfield-Branson National (SGF). This indicates that Missouri's airports are an important asset in the U.S. airport system, and they have the ability to handle large amounts of freight tonnage. Missouri should continue to build upon its air freight potential.
- The National Transportation Atlas Data through the Bureau of Transportation Statistics identified 114 intermodal facilities in Missouri that provide a variety of intermodal interactions. The majority of the intermodal facilities (71 percent) accommodate the rail – truck commodity transfers, followed by modal transfers at ports (16 percent) and airports (8 percent), indicating well connected truck and rail modes, which Missouri should build upon and extend connections for other modes.
- Missouri has significant freight rail infrastructure with six Class I freight railroads operating 4,218 miles of main track rail lines within the State. There are also five short line railroads that serve Missouri. These railroads provide important connections to businesses, water ports, and intermodal terminals. This is a competitive advantage in terms of rail service for Missouri to build upon.

Challenges

Appendix C: Strengths and Challenges

- Missouri has more State highway miles than Kansas and Illinois combined, but with only one-third of Illinois' revenue. This lack of funding creates a challenge for maintaining or upgrading the highway system.
- Annual hours of truck delay for CY2014 and the annual cost of delay for the trucking industry on interstate highways in Missouri is shown in **Table C-1**. Annual hours of truck delay quantifies the extra time spent by commercial motor vehicles on an interstate corridor based upon a state-determined threshold. Missouri's threshold is set at five mph below the speed limit. Speeds below that rate indicate congestion and/or other delay factors for trucks.² Time delays and additional costs affect trucking companies and can cause them to make changes to avoid these areas. This can also have an ill effect on Missouri businesses in terms of increased costs and being able to deliver in a timely manner.

Table C-1: Annual Hours and Cost of Delay on Missouri Interstates

Interstate Highway	Annual Hours Delay	Annual Cost of Delay (Millions)
I-70	399,986	34.7
I-44	421,739	38.6
I-55	221,325	19.2
I-35	125,608	10.9

Source: Missouri Department of Transportation, Tracker Report, April, 2014

- Truck freight density growth projections for the Missouri road network indicate the greatest future volume increases will occur on I-44 and I-55. Capacity upgrades on I-70 from Kansas City to St. Louis are needed to maintain network reliability. The ability to maintain or upgrade to meet these needs is limited as transportation revenues decrease. Several other interstate routes, including I-44, were also identified as key corridors for continued investment, which is a challenge as funding is limited.
- There are bottlenecks throughout the State at a number of locations on the highway network. These bottlenecks can be caused by capacity issues, as well as geometric issues. Improvements are needed to eliminate these bottlenecks. These bottlenecks cause congestion and hinder freight. Mobility in these areas may be difficult.
- The St. Louis and Kansas City metro areas account for more than 80 percent of the State's 100 worst truck bottlenecks. The St. Louis region contained 59 out of the worst 100 bottlenecks. The most severe bottlenecks appear to be concentrated near the confluence of Interstates 70, 64, 55, and 44 near downtown St. Louis (evaluation completed prior to the completion of the new I-70 bridge). In Kansas City, 22 of the worst 100 bottlenecks were identified. The complex

Appendix C: Strengths and Challenges

intersection with I-70, I-670, I-35, and State Route 9 generated a truck bottleneck along all of those routes near downtown Kansas City. Springfield contained seven of the worst 100 bottlenecks. The most severe bottleneck was in the area located on State Route 744 (E. Kearney Street) between U.S. 65 and N. Glenstone Avenue.

- Missouri has a significant freight rail infrastructure and is uniquely positioned to the Mississippi and Missouri Rivers for providing rail access to ship and barge traffic. However, Missouri's rail lines are at or near capacity in many locations. Capacity and operational improvements to the Class 1 rail lines are needed. Freight density growth projections across the Missouri rail network indicate the greatest future volume increases will occur on the BNSF line connecting Kansas City and Chicago. This line is currently approaching its capacity and will require improvements to accommodate increasing future volumes.
- A bottleneck at the intersection of rail lines in the West Bottoms area of Kansas City currently exists. This bottleneck creates significant delays in freight rail movements. Coordination with the rail companies that own these rail lines and a solution to eliminate this bottleneck is needed.
- There are two rail bridges across the Mississippi River in St. Louis, owned by Terminal Railroad Association (TRRA), which serve all Class 1 railroads. The Merchants Bridge and the McArthur Bridge were built in 1890 and 1912, respectively. While there is redundancy in the rail system, the condition of these bridges is a concern. In addition, these are both National Freight Corridors, so their impact on the transportation system stretches beyond Missouri.
- Missouri contains 1,050 miles of navigable rivers, including 500 miles of the Mississippi River and 550 miles of the Missouri River. Three public port authorities and over 50 private ports operate along the Missouri River, while 14 public and more than 200 private ports operate on the Mississippi River.
- There is capacity to expand waterborne traffic on the Missouri and Mississippi Rivers. However, the frequency of dredging, lack of improvements to the locks and dams, and inconsistent water levels hinder an increase in traffic.
- There is an opportunity for transloading containers onto barges. However, potential obstacles to greater use of Container on Vessel (COV) in Missouri include readiness of ports, delivery requirements for ports to sustain service, and inefficiencies in backhauling empty containers.
- Initiation of COV service depends on the development of partnerships between key port operators and shipping stakeholders. According to "Missouri Public Port Authorities: Assessment of Importance and Needs" – all current port facilities, with limited capital investments, could operate as a COV facility.
- The cargo facilities at the St. Louis Airport (STL) need to be updated and expanded in order to allow for changes in technology and efficiency and also need to include aircraft capable of handling larger cargo.
- A wide range of freight stakeholders, including trucking companies, railroads, and port authorities surveyed indicate that reliability and funding are the greatest challenges facing Missouri's freight system. Concerns about reliability stem from congestion and capacity issues

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for these modes which slow down freight movements. The inability to move forward in these areas can often be linked back to a lack of funding to make improvements.

System Operations

This section discusses the Strengths and Challenges that were identified in the operations of Missouri's freight system. These Strengths and Challenges are associated to road and bridge conditions, freight reliability issues, and other system operations issues.

Strengths

- MoDOT started a major road improvement program in 2004 called the Smooth Road Initiative. Over the next two years, the program improved 2,200 miles of Missouri's major routes, bringing them from 47 percent in good condition up to 74 percent. The Better Roads, Brighter Future program in 2007 further improved the system, increasing Missouri's major routes in good condition to 85 percent. Currently more than 89 percent of major highways are rated in good condition.² Consequently, a majority of Missouri's major routes are currently in good condition, and freight traffic will not be slowed down for this reason. MoDOT needs to maintain this strength, although long-term funding is a challenge.
- Statewide, the number of bridge structures in poor condition dramatically decreased over the last five years and the number of structures in good condition moderately improved up until 2011. These improvements were heavily impacted by the Safe & Sound Bridge Improvement Program that was completed in 2012, and by the increased construction program that resulted from the passage of Amendment 3 in 2004. While the number of poor condition bridges dropped by 713 over this five year period, the number in good condition only increased by 276. The number in fair condition increased by 473 over this period, which is reflective of MoDOT's aging bridge population with many structures at the point where they need minor maintenance or rehabilitation.² Bridges in poor condition can slow down traffic including freight traffic in two ways. First, the condition itself makes it so vehicles cannot travel at the most efficient speeds. Second, construction on bridges in poor condition slows down traffic or forces closures, which cause congestion. The fact that the number of bridges in poor condition is decreasing is a strength because freight traffic will not be slowed down for these reasons. For the 208 major bridges (i.e., 1,000 feet or longer) in Missouri, the number of structures in the poor category has dropped over the last five years because of an aggressive focus on these structures.²
- There is only a total of 73 low vertical clearance bridges in Missouri, which represents less than one percent of all bridges in the State. In addition, only 135 (three percent) of the 4,849 weight restricted bridges in Missouri cross interstates and 81 (two percent) cross U.S. highways. This is a strength for freight truck traffic because their travel routes are not limited by a high number of low clearance bridges that have to be avoided. This is especially true for oversized loads. MoDOT should build upon this strength by continuing to address low clearance and load restricted bridges over time.
- MAP-21 set a national performance goal to have the Structurally Deficient (SD) deck area of National Highway System (NHS) bridges at less than 10 percent. Missouri's local system has 144 NHS structures (five SD) and MoDOT's system has 3,591 NHS structures (153 SD). MoDOT

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currently meets the national performance goal with the total at 6.7 percent, which is attributable to aggressive efforts undertaken with rehabilitation and reconstruction on major bridges over the last 10 years as well as other accelerated construction from MoDOT's bonding program.² Roadways in poor condition can slow down traffic including freight traffic in two ways. First, the condition itself makes it where vehicles cannot travel at the most efficient speeds. Second, construction on bridge in poor condition slows down traffic and causes congestion. The fact that Missouri is meeting the national performance goal and its roadways are in good condition is a strength because freight traffic will not be slowed down for these reasons. MoDOT needs to maintain this strength, although long-term funding is a challenge.

- Transportation infrastructure leads to the attraction of new businesses and of employers looking to expand. These actions lead to new jobs, new opportunities and new revenue for states. A robust transportation infrastructure allows manufacturers to distribute their products quickly and inexpensively. Between 2009 and 2011, Missouri's national rank in transportation infrastructure was in the top nine. In 2012 Missouri ranked 20th. Missouri's current ranking of fifth best in the nation will be challenging to maintain as the State's annual transportation infrastructure spending has continued to decrease since 2011 due to a lack of funding.
- The Truck Reliability Index (TRI) is a reliability measure that is proposed to be used as a MAP-21 national freight performance measure. By comparing the TRI for each corridor year by year, MoDOT can determine if the corridor has become less or more reliable. A lower index for a succeeding year means reliability has improved with TRI of 1.0 representing perfect conditions. Calendar year 2013 values for the five major interstate corridors included: I-70(1.07), I-44(1.13), I-55(1.14), and I-35(1.11).² All of these values are relatively close to one, indicating a relatively high level of highway reliability based on current conditions, a strength Missouri should work to maintain.

Challenges

- Minimizing travel times and delays on the State's most traveled routes are essential to operating a reliable transportation system. The desired outcome for any route is a safe flow of traffic at the posted speed limit. From January to March 2014, it took drivers, on average, 12.75 minutes during the morning rush and 12.99 minutes during the evening rush to travel 10 miles on interstate routes in St. Louis. For interstates in Kansas City, it took drivers, on average, 11.14 minutes during the morning rush and 11.32 minutes during the evening rush to travel 10 miles. This is the equivalent of driving 50 mph.²

Individual roadways within St. Louis and Kansas City, however, experienced longer travel times than the regional averages. In St. Louis, this was true on I-64 and I-170 and in Kansas City on I-35 where average rush hour speeds on these routes were between 35 and 45 mph, respectively. In St. Louis, the heaviest recurring congestion existed on segments of I-64 (a.m. and p.m.) and on I-270 northbound (a.m.), while in Kansas City the heaviest recurring congestion occurred in the downtown region. Significant congestion also occurred in Kansas City on MO 291 north of

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the Missouri River (p.m.). In Columbia and Springfield, most traffic delays occurred on signalized arterials. For arterials, the most significant congestion occurred on Stadium Boulevard near I-70 in Columbia and on MO 13 (Kansas Expressway) near I-44 in Springfield during both the a.m. and p.m. rush hours. Travel time delays costs money for vehicles and drivers stuck in traffic and planning time so loads arrive on time.

- Recurring congestion occurs at regular times, although the traffic jams are not necessarily consistent day-to-day. Nonrecurring congestion is an unexpected traffic crash or natural disaster that affects traffic flow. When either occurs, the time required for a given trip becomes unpredictable. This unreliability is costly for commuters and truck drivers moving goods which results in higher prices to consumers.

The Kansas City and St. Louis metro regions both fall within the definition of larger urban areas where annual congestion cost totals are calculated. The annual congestion cost totals for commuters and freight in Kansas City show a slight decrease from 2007 (\$677M) to 2009 (\$578M) and a slight increase from 2010 (\$636M) to 2011 (\$640M). In St. Louis the measure shows a slight increase in 2008 (\$1,184M) and a slight decrease through 2010 (\$1,115M). The costs in Kansas City from 2007-11 were 21-30 percent below the national average for large cities, St. Louis was 20-32 percent above the national average.² Although these costs are below the national average, they still represent issues to address.

- St. Louis and Kansas City have demonstrated quick clearance of traffic-delaying incidents with yearly averages of 28.3 minutes and 27.3 minutes, respectively. However, average clearance times for St. Louis and Kansas City have generally increased since 2010.² Increased clearance time of traffic incidents increases congestion and slows freight movements.
- Interstates are the arteries that connect the country and keep commerce flowing. When interstates shut down in Missouri, the country is also disconnected. Sometimes nature and vehicle crashes affect MoDOT's ability to keep the interstates moving. Twenty-six complete closures or blockages occurred on I-70 in 2013, with 22 complete closures on I-44 in 2013. The length of closure and location of these closures varied with the majority being attributed to vehicle crashes.²
- Despite a significant investment in major bridges longer than 1,000 feet, the number of structures in good condition generally dropped over the five-year period while the number in fair condition significantly increased. This is reflective of MoDOT's aging bridge population with many structures at the point where they need minor maintenance or rehabilitation. In addition, there are 4,849 load restricted bridges in Missouri or approximately 20 percent of all bridges in the State.² This indicates that Missouri's infrastructure is aging and will require additional investment for repairs in the future with limited funds available.
- Stakeholders believe it is a challenge to monitor and focus rail operation upgrades when this asset is owned and operated by private entities that have to consider impacts on profits.

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- In the Northwest and Northeast districts rail lines were removed, which hinders economic development in these areas. Coordination with the rail companies is needed and a different solution than removal of rail lines is needed.
- The majority of the locks and dams on the Mississippi River were constructed in the 1930s and are showing their age. The seven locks and dams in or near Missouri are a part of the Upper Mississippi River, starting just north of St. Louis and extending to the Iowa border. The locks and dams are in need of major rehabilitation or replacement which is an expensive undertaking.

The maintenance needs of the aging infrastructure are increasing at a rate much greater than the operations and maintenance funding provided for the system, which adversely affects reliability of the system. Long-established programs for preventive maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

- Stakeholders believe that the failure to dredge and maintain navigable channels on both the Missouri and Mississippi Rivers is a problem. From the 1930's to the 1960's, six dams were constructed on the Missouri River, creating the largest reservoir system in the U.S. Missouri has an interest in the river as a source of drinking water as well as recreation, power generation, water supply, river commerce, and fish and wildlife.³ Regulations determine how much water is stored, mainly in the upper three reservoirs in Montana, North Dakota, and South Dakota. This then determines what water flows exist for the Missouri River and often creates drastic fluctuations in water levels that prevent reliable navigation. Missouri's position is that water flows should be maintained at levels that allow for reliable navigation.
- At ports throughout the State, increased maintenance activities are needed on both the land and water sides of the operations.
- Numerous emerging ports have been identified throughout the State. Support for their development is needed.
- The Springfield Airport (SGF) has been identified by the Federal Aviation Administration as an airport that may have its tower hours reduced. Having reduced hours would reduce the number of flights in and out of SGF, which would affect the amount of freight that could come through the airport as well.

Safety

This section discusses the safety strengths and challenges on the State's freight system. These strengths and challenges are associated with the numbers of Commercial Motor Vehicle (CMV) crashes, rail crossing issues, and other safety-related issues.

Strengths

- Roadway safety improvements helped reduce overall roadway fatalities from 1,200 in 2005 to less than 800 in 2013, the lowest since the 1940s.⁴ This in turn limits back-ups and congestion

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caused by crashes, resulting in less delay to freight truck traffic, as well as reducing the cost of crashes and fatalities.

- The number of CMV fatal crashes through the fourth quarter of 2013 was 82. Even with reduced resources, this is 22 fewer than reported in 2012, a 21.1 percent decrease. Between 2009 and 2013, fatal crashes involving a CMV decreased by 8.9 percent.² A reduction of fatal crashes limits back-ups and congestion, with less delay for freight truck traffic.
- The number of CMV serious injury crashes reported through the fourth quarter of 2013 was 311. This number is 17 more than reported in 2012, an increase of six percent. However, between 2009 and 2013, CMV serious injury crashes decreased by 18 percent.² Missouri needs to continue with efforts that help further reduce CMV crashes.

Challenges

- Diminished funding will hamper MoDOT's ability to make significant safety improvements in the future.²
- Key safety issues include the lack of safe truck parking, numerous at-grade rail crossings, and roadway design and geometric improvements to facilitate safety. A lack of truck parking can discourage companies from doing business in the area.
- At-grade rail crossings can be a problem, and crashes at these locations can cause back-ups and congestion that delay both rail and truck traffic.
- The top three interstate and US/MO routes with the highest three-year CMV crash rates are listed in **Table C-2**. This is a challenge because crashes can cause back-ups and congestion that delay freight truck traffic and potentially cause loss of life and property.

Table C-2: Top Interstate and US/MO Route CMV Crash Rate Locations

Interstate Segment	Direction	To	From
I-55	North	I-44	I-70
I-55	South	I-70	I-44
I-29	South	I-435 (north)	I-35 split
US/MO Route Segment	Direction	To	From
MO 13	South	I-44	US 60
MO 210	East	I-435	MO 291
MO 13	North	US 60	I-44

Source: MoDOT crash data

- Stakeholders indicated that at-grade rail crossings throughout the State present a safety issue and that improvements at all at-grade rail crossings with safety issues are needed. In 2011 and 2012 Missouri had 50 highway-rail incidents each year, while in 2013 the number of highway-rail incidents was 53.⁵

Appendix C: Strengths and Challenges

Connectivity

This section discusses the strengths and challenges of connectivity across the Missouri freight system. These strengths and challenges are in relation to both connectivity between modes, as well as connectivity across the State.

Strengths

- Missouri is a “crossroads for the continent.” Missouri’s central location in the U.S. was consistently identified as a top strength of the State’s freight system and an asset for attracting new business.
- The Panama Canal is now undergoing a \$5.25 billion expansion to be completed in 2015. The completion of the Canal will enhance one of the most important trade links in the world by linking the Atlantic and Pacific Oceans. When the Canal expansion is complete the new locks will allow for deeper, longer and wider vessels, doubling its existing throughput capacity.¹ Reduction of transportation costs due to Canal expansion could affect the movement of goods on inland waterways in two ways. First, a reduction in ocean transportation costs out of Gulf ports due to the use of larger, more efficient ships will reduce aggregate costs of exporting bulk commodities, such as grain, by the Mississippi River route rather than by rail through Pacific Northwest ports. Second, lower transportation costs attributable to expansion of the Canal could increase export volumes as the transportation element of U.S.-produced commodity costs helps to make U.S. exports more competitive in world markets. While the scale and timing of the impacts to Missouri freight flows is unknown at this time, it is anticipated that the expansion will change international trade flows and change the demands on transportation networks, service, and operation.

All of these growth factors will likely lead to a growth in freight movements within Missouri. The growth in freight movements will result in increasing demands on the highways, rail lines, port facilities and airports handling air cargo freight. The completion of the Panama Canal expansion project may alter some shipping patterns. If shipping costs remain competitive and carriers can be responsive to customer demands, then the markets could foster changes in some supply chains to include increased imports and exports throughout southern and eastern U.S. ports.⁶

- The Missouri River and the Mississippi are key assets to Missouri based on their central location in the U.S. and that the Missouri River and the Lower Mississippi River are lock free.
- The Kansas City metropolitan area is one of the largest rail freight and trucking hubs in the country. These are important resources to build upon.
- Southwest Missouri is experiencing large growth in manufacturing from the KCS, BNSF, and the multiple interstates leading to Mexico and the Gulf.

Challenges

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- Not all modes are readily accessible and well connected with other modes (i.e. rail to water ports). A high priority project that will look to fix this issue is the New Bourbon Port connection from the port to I-55 and a rail connection to St. Francois County.
- Major freight generator sites have been identified throughout the State. Connectivity to these sites is a key issue, including the last mile connections to encourage continued use of these sites and future growth
- Future growth is threatened by railroads closing local crossings and spurs, and also removing scales.
- There is no program or funding to provide last mile connections for rail access. Class 1 Railroads invest millions into maintaining the tracks for through traffic, but the spur connections or last mile connections into specific sites are the biggest challenge for both freight movers and public agencies.

Current Freight System Deficiencies Related to Freight Plan Goals

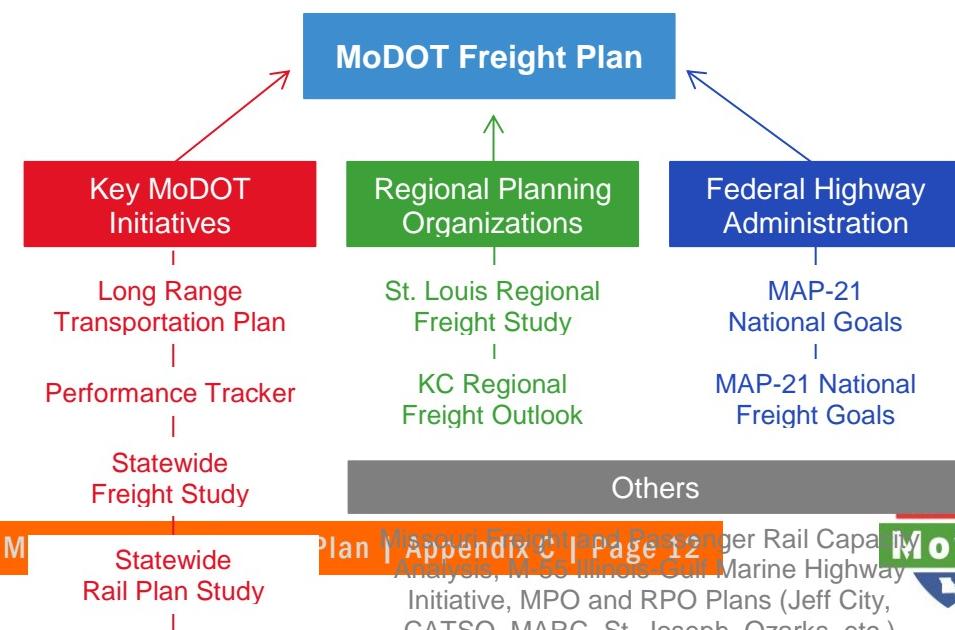
This section provides an assessment of the current state of Missouri's freight system and how the system measures up to the goals and objectives identified for the freight plan.

A critical component of creating the freight plan is the development of goals and objectives that will help MoDOT prioritize projects and guide investment decisions. The freight plan goals were not created in isolation; but their development was informed by, and aligned with, other state plans and national policies that already exist or are in development. Specifically, the freight plan goals are consistent with:

- Moving Ahead for Progress in the 21st Century Act (MAP-21)
- Key MoDOT Initiatives
- Other Regional and Statewide Plans with a Freight Component

While these plans and policies provide the basis for establishing the freight plan goals, stakeholder input was also integrated into their development. Additionally, **Figure C-1** illustrates some of the considerations used in establishing the freight plan goals.

Figure C-1: Considerations into the MoDOT Freight Plan Goals



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After examining the strategic frameworks from relevant State plans including *Vision for Missouri's Transportation Future*, other State and regional plans, and the new federal requirements as defined by MAP-21, MoDOT determined that the goal areas developed for the Long Range Transportation Plan should also be adopted as the freight plan goals. The resulting four pillars driving transportation decisions are maintenance, safety, economy and, connectivity/mobility. There are three strategic areas that build upon these four pillars from *Vision for Missouri's Transportation Future* that are also being considered, including environmental, organizational and process, and customers and partners.

The objectives listed below by goal were developed in order to meet the needs identified from stakeholder input and a review of other plans with a freight component.

Maintenance

The maintenance goal aims to ensure that the freight system is maintained in good condition by:

- Keeping the highways and bridges in good condition
- Supporting and encouraging the maintenance of railways, waterways, airports, and multimodal connections

While MoDOT is currently exceeding their goals for highway and bridge maintenance, the number of awards to contractors has dropped due to a lack of funding. Without enough funding it will be increasingly difficult to maintain the current condition for not only highways and bridges, but all freight modes. The number of highway miles that Missouri must maintain and the age of some of the facilities from highway and rail bridges to outdated airport facilities and lock and dams are a challenge to meeting this goal.

Safety

The safety goal looks to improve safety on the freight system by:

- Decreasing the number and severity of crashes involving CMVs
- Improving safety at railroad crossings

While the instance of CMV crashes has trended downward, highway-rail crossing incidents have slightly increased over the last several years. MoDOT continually strives to decrease the numbers and severity of these incidents across all modes. However, diminished funding will hamper MoDOT's ability to make

Appendix C: Strengths and Challenges

significant safety improvements in the future. Key challenges to the safety goal include lack of safe truck parking, numerous at-grade rail crossings and roadway design and geometrics that are in need of improvement.

Economy

The economy goal supports economic growth and competitiveness and job growth in Missouri by:

- Improving the economic competitiveness in Missouri through improvements to the freight system
- Enhancing and supporting opportunities for economic development and job growth through improvements to the freight system

While the cost to ship several of Missouri's major export commodities (e.g., soybeans, automobiles and chemicals) is relatively low compared to competing states, MoDOT has only recently begun quantifying and calculating this measurement of goods movement and competitiveness. The bulleted items above have been identified as performance measures in the freight plan and will continue to be monitored in relation to meeting economic goals. Challenges to economic growth and competitiveness, as it relates to freight, include the need to upgrade aging facilities, travel delays that cost shippers time and money, and the need to support growth beyond truck and rail, including areas such as air cargo and waterways and port development.

Connectivity and Mobility

The connectivity and mobility goal seeks to improve the connectivity and mobility of the freight system throughout the State by:

- Improving the multi-modal connectivity of the freight system
- Reducing congestion and increasing reliability on roadways
- Supporting and encouraging improved efficiency of rails, waterways, and airports
- Improving connections to freight generators

While the amount of total freight tonnage in Missouri has increased over the last several years, MoDOT has only recently begun measuring annual hours of truck delay and calculating the truck reliability index. These parameters have been identified as performance measures in the freight plan and will continue to be monitored in relation to meeting the connectivity and mobility goal. Key issues in meeting the connectivity and mobility goal include cutting down on the number of accidents and congestion that can cause delays or stop movement altogether, the lack of accessibility and connection between modes, the need to maintain or improve last mile connections to major freight generator sites and the threat of closures of local rail crossings and spurs.

Next Steps

Identifying the strengths and challenges, as well as which goals are not being met, are a vital part of the overall MoDOT freight plan development effort. This information will be used as input in project

Appendix C: Strengths and Challenges

identification, selection, and prioritization. The strategies and implementation plan for the freight plan were developed to address the strengths and challenges in collaboration with stakeholders and other Missourians.

Appendix C: Strengths and Challenges

References

¹CDM Smith for MoDOT, Goals and Performance Measures Technical Memorandum, Missouri State Freight Plan, July XX, 2014

²Missouri Department of Transportation, Tracker Report, April, 2014

³ http://www.dnr.mo.gov/env/wrc/interstwtrs/missouri_river.htm

⁴Missouri Department of Transportation, Missouri's Declining Investment in Transportation Handout, June, 2014

⁵<http://safetydata.fra.dot.gov/officeofsafety/publicsite/Query/stchart.aspx>, July 15, 2014

⁶U.S. Department of Transportation, Panama Canal Expansion Study – Phase I Report, November, 2013.

Appendix D: Stakeholder Outreach

During the creation and implementation of this State Freight Transportation Plan, key freight stakeholders provided feedback which helped MoDOT make decisions and form recommendations.

Stakeholders were vital in the creation of this plan and MoDOT remains committed that stakeholders will be involved in all future freight planning work.

Introduction

Hundreds of freight stakeholders representing different freight modes and areas of the State were involved in creating this Freight Plan and the creation of a framework to identify strategic investments in the system that would bolster Missouri's economy.

Efforts focused on encouraging stakeholders such as logistics directors, carriers, shipping managers, economic development professionals and leaders of private industry to be involved in each step of creating this plan. All outreach activities were guided by the Freight Steering Committee made up of key stakeholders and MoDOT leadership.

Goals of stakeholder outreach were to:

- Better understand, as an agency and as a State, what the costs are to Missouri's economy if our freight network stagnates or deteriorates.
- Articulate what freight projects would be most helpful to the State if additional funds were made available.
- Collect thoughts on making businesses and communities more competitive – whether through improvement projects or policy changes.

50+ Key Stakeholder Interviews
60+ Surveys
150+ Attendance at 7 District Forums Steering Committee composed of key stakeholders who guided the outreach process
100+ Attendance at 3 Priorities & Investments Forums
500+ Stakeholders reached out to through grassroots events



Appendix D - Stakeholder Outreach

Throughout the State, stakeholders provided input through:

- Electronic and paper surveys and comment forms
- In-person and phone interviews
- Multiple rounds of forums/webinars.
- Direct/grassroots outreach.

Statewide Themes

Several reoccurring themes consistent throughout the State emerged early during stakeholder outreach including:

- Missouri has long been a center of trade. From its rivers to rails, highways and airways, Missouri is a freight hub.
- We heard that, yes, Missouri generally has a well-connected road network but when 'hiccups' like a crash, weather or construction occur, there isn't enough resiliency to keep the system flowing and transport slows or stops.
- There is also a strong voice for increasing the capacity and maintenance of the existing network, including along I-70 and I-44.
- We heard that more rail connections are needed from the network to centers of industry. Many grade crossing improvements and separations are needed to increase safety.
- We also heard that Missourians are interested in increasing utilization of our waterways. There is particular interest in waterway solutions that focus on container handling and harbor dredging.

Initial Two-Way Understanding with Stakeholders

Work kicked off on this Freight Plan during November 2013 and stakeholders were asked to participate in the very early stages.

Freight Steering Committee

Freight Steering Committee members included freight and State leaders and select members of MoDOT leadership and staff. The committee convened monthly. It provided feedback on the plan at project milestones, reviewed materials, represented a diverse group of freight interests, and helped connect MoDOT to other stakeholders. Steering Committee members included:

- Tom Crawford, Missouri Trucking Association
- Chris Gutierrez, KC SmartPort
- John Ferguson, Pemiscot County Port Authority
- Mike Hemericks, Missouri Department of Economic Development
- Ben Jones, Union Pacific Railroad
- Chris Klenken, Missouri Department of Agriculture
- David Lancaster, Lambert International Airport

Appendix D - Stakeholder Outreach

- Kevin Ward, Federal Highway Administration
- Mike Kearney, Ameren UE

MoDOT Steering Committee members included:

- Kathy Harvey, Chair
- Michelle Teel, Multimodal
- Machelle Watkins, Planning
- Scott Marion, Motor Carriers
- Becky Baltz, Southwest District
- Tom Blair, St. Louis District
- Joe Jones, Policy
- Bob Brendel, Customer Relations
- Dan Niec, Kansas City District

Ex-officio MoDOT Steering Committee Members included:

- Dave Nichols, Director
- Ed Hassinger, Chief Engineer
- Roberta Broeker, CFO

Appendix D - Stakeholder Outreach

Key Freight Stakeholder Interviews and Surveys: Results and Analysis

To initiate stakeholder involvement, MoDOT identified 96 contacts in freight-related services including manufacturing, economic development, logistic and carriers to be interviewed regarding the strengths, weaknesses and needed investments in the freight network. An email invitation announcing the project was distributed with the Plan fact sheet to familiarize stakeholders with the launch of the Plan. The project team followed up with phone interviews. In total, 53 interviews were conducted and an electronic survey tool was used to track responses. The following is a list of interviewees categorized by MoDOT District.

Table D-1: Stakeholder Interviews Conducted by MoDOT District

Organization	Contact	MoDOT District
Fort Leonard Wood	Richard Tharp	Central
Gallup Trucking	Jamie	Central
Greater KC Chamber of Commerce	Kristi Wyatt	KC
Kansas City EDC	Pete Fullerton	KC
KC SmartPort	Chris Gutierrez	KC
KC Southern Railroad	Kevin McIntosh	KC
TranSystems	Sara Clark	KC
Wagner Logistics	John Wagner	KC
Mid America Regional Council	Mell Henderson	KC
Lewis County-Canton Port Authority	Bill Smith	NE
Marion County Port Authority	George Walley	NE
Mid-America Port Commission	Charles Bell	NE
Orscheln Industries	Richard Powers	NE
Pike/Lincoln County Port Authority	Carolyn Wisecarver	NE
Boonslick Regional Planning Commission	Chuck Eichmeyer	NE
Altec	Tom Richmond	NW
Kawasaki Motors Manufacturing	Steve Bratt	NW
Nodaway County Economic Development	Lisa Macali	NW
St. Joseph Regional Port Authority	Brad Lau	NW
Bootheel Reg. Planning & Econ. Devel. Commission	Steve Duke	SE
Cape Girardeau Area Chamber of Commerce	John Mehner	SE
New Bourbon Regional Port Authority	Ron Steele	SE
New Madrid County Port Authority	Timmie Hunter	SE
Orgill	Denny Koonce	SE
Ozark Foothills Regional Planning Commission	Andrew Murphy	SE
Pemiscot County Port Authority	David Madison	SE
SE MO Reg. Planning & Econ. Develop. Commission	Chauncy Buchheit	SE
Southeast Missouri Regional Port Authority	Dan Overbey	SE
Western Dairy Transport	Drew Honeycutt	SE
AEP River Operations	George Piccioni	STL

Appendix D - Stakeholder Outreach

ARCO	Tracey Ball	STL
City of St. Louis Port Authority	Nick Nichols	STL
Davidson Surface and Air	Jason Schrum	STL
Jefferson County Port Authority	Janice Luchan	STL
North County Inc.	Rebecca Zoll	STL
Transportation Club of St. Louis	Brad Reinhardt	STL
Monsanto	Duane Simpson	STL
St. Louis Economic Development Partnership	Doug Rasmussen	STL
St. Louis Regional Chamber	Louis Copilevitz	STL
Associated Wholesale Grocers, Elite Logistics	Todd Smith	SW
Jared Enterprises	Curtis Jared	SW
Joplin Area Chamber of Commerce	Rob O'Brian	SW
Joplin Regional Partnership	Kevin Welch	SW
O'Reilly Auto Parts	Brian Roesler	SW
Springfield Branson National Airport	Brian Weiler	SW
Springfield Chamber of Commerce	Jeff Seifried	SW
Springfield Chamber of Commerce	Larry Snyder	SW
Wil Fischer Distributing Co.	Mary Cooper	SW
Associated Industries of Missouri	Ray McCarty	Statewide
BNSF	Darrell Coffey	Statewide
Dysart Taylor	Kenneth Hoffman	Statewide
Missouri Agricultural and Small Business Development Authority	Tony Stafford	Statewide
Missouri Chamber of Commerce	Dan Mehan	Statewide
Missouri Farm Bureau Federation	Estil Fretwell	Statewide

Additionally surveys were sent to other stakeholders.

Both interviews and surveys fall into four separate categories, and questions were tailored to each of the four groups: industry leaders; economic development professionals; general freight stakeholders and interested public; and motor carriers, shippers and receiver representatives. Each of the survey results (that includes the interviews) are available in Attachments 1, 2, 3 and 4.

All interviews and surveys included the following three questions:

- What are the greatest strengths of Missouri's freight network?
- What are the biggest challenges for Missouri freight in the next 5 to 10 years?
- If you had a blank check to provide the greatest improvement to Missouri freight transportation, where would you spend the money?

Additionally, surveys were emailed directly and made available on the website for input from the general public. The responses were analyzed from a statewide and district-specific perspective.

Appendix D - Stakeholder Outreach

The surveys conducted served as a baseline for the project team for stakeholder involvement. There were some themes that evolved during the entire stakeholder involvement process. An example of this is that in these surveys most of those interviewed did not indicate that connectivity was important for the Districts and the State. However, during further discussion at forums and grassroots outreach events, connectivity through freight networks and modes was identified as a priority.

Appendix D - Stakeholder Outreach

District Freight Forums (January–February 2014)

Building upon the stakeholder interviews and surveys, freight forums were held in each MoDOT district to discuss freight issues and opportunities with a broader set of freight stakeholders. Forum locations included:

- Kansas City
- St. Louis
- Sikeston
- Jefferson City
- St. Joseph
- Springfield
- Hannibal (*held as a webinar due to weather cancellation)

In all, more than 150 stakeholders participated in these discussions and provided valuable feedback to plan efforts.

A narrated presentation from the forums was also posted to the project website to start discussions with those stakeholders unable to attend. A copy of the presentation is provided in Attachment 5.

District summaries based on the results from the forums were created and are presented in Attachments 6–12.

Statewide Themes

During the District forums several overarching, statewide themes emerged including:

- Capacity upgrades to I-70 are a top priority. Additional lanes were suggested to provide better reliability along the corridor.
- Missouri generally has a well-connected and functioning road network until there is a hiccup, such as congestion, weather or construction. Stakeholders also identified a need for capacity and maintenance improvements to maintain reliability of interstates and minor routes.
- Missouri is a “crossroads for the continent” and has a vast freight network that is an asset for retaining existing businesses and attracting new business. Stakeholders voiced concern that not all modes are readily

Figure D-1: Number of stakeholders in attendance at each district freight forum.

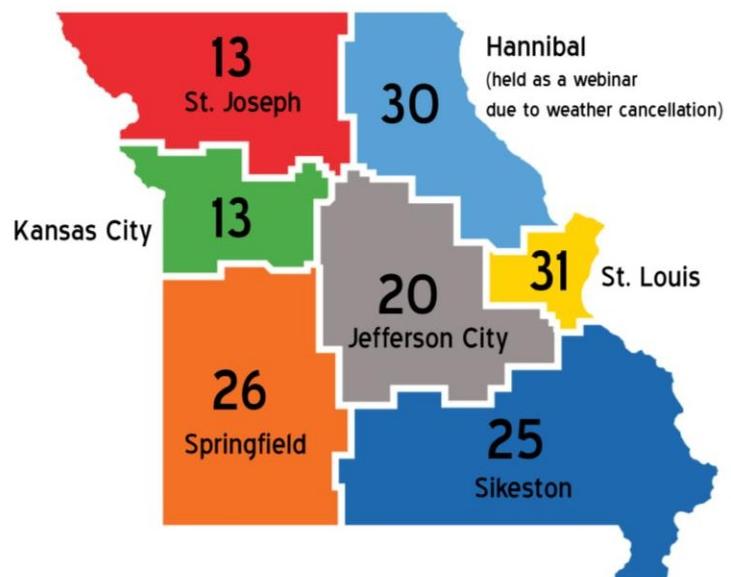


Figure D-2: Statewide themes heard from stakeholders in District forums

What have we heard during outreach across the state?

-  Generally, well-connected road network, but...
-  Connect all freight modes
-  Engage all stakeholders
-  Utilize waterways

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accessible and well connected with other modes (e.g. rail to water ports) and that work needs to be done to integrate the freight modal networks.

- There is a need to engage additional stakeholders to help guide the freight plan. Previous efforts have lacked private sector engagement. Over the last several years MoDOT has collaborated with several private sector groups on successful projects. This is an opportunity to build on those relationships, share information and continue to collaborate.
- Investigate possibilities for utilizing waterways. Stakeholders see potential for growth on the Missouri and Mississippi Rivers but consistently brought up concerns including frequency of dredging, lack of improvements to the lock and dam system and inconsistent water levels. The expansion of the Panama Canal was also mentioned by stakeholders who want to make sure the state is positioned to take advantage of potentially increased freight flow and remain competitive. Stakeholders are concerned about low water levels and the impacts to operations if dredging frequency decreases.
- Appropriately funding freight transportation projects is a key stakeholder concern. Stakeholders voiced a need to preserve the existing freight network and systems, but also said that improvements and enhancements are keys to growing the state's economy.

District Themes

Themes also emerged in each District. They include:

Northwest District

- Farm-to-market routes are essential to the region's economy. Rail access in this region is decreasing, so state-maintained lettered routes are very important, not only for moving agriculture goods, but also as connections for manufacturers to highways and interstates.
- Road capacity upgrades are important in the region. Despite I-70 passing outside of the District to the south, stakeholders indicated that it should be improved to a six-lane facility. Stakeholders also suggested increasing capacity to four lanes between I-29 and I-35 through Maryville. US-36 is an important corridor for business owners and should be considered for interstate designation. One private truck freight fleet operator called US-36 a "national best-kept secret." He explained that it is a safer route and that it saves his drivers an hour in drive time to Indianapolis.
- There is a dwindling rail presence in the district. Stakeholders pointed out that there were more freight rail options in the past and many of those options no longer exist in the District.
- Economic development efforts, such as the Eastowne Business Park in St. Joseph, need adequate roadway access. In addition, food industry businesses, such as Farmland Foods, could benefit from investment in intermodal access.
- Low water levels and water quality in the district and throughout the State concern stakeholders, as does local funding for the port.

Northeast District

- Capacity expansion and maintenance of highway networks are essential to ensuring network reliability. Specific examples of maintenance issues provided by stakeholders included US-36

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from Shelbina to Hunnewell and Monroe City and along US-61 between Palmyra and Hannibal. Road surfaces in many sections are “rougher than a cob.” Capacity issues include too much truck traffic on I-70, and bottlenecking on US-61 in Hannibal and on the I-70 interchange in Warrenton.

- Future growth is threatened by a dwindling rail presence in the District.
- Locks and dams along the Mississippi River need improvement. Port stakeholders in this region mentioned the deteriorating condition of the lock and dam system as a challenge for Missouri freight in the future.

Kansas City District

- The Kansas City community is proud of its status as one of the largest rail freight and trucking hubs in the country. Stakeholders commented that integrating different freight modes is important regionally and nationally. Assets in this district include a rapidly growing Foreign Trade Zone and the BNSF multi-modal facility located across the state line in Kansas, which will have the largest speculative space in the country.
- Capacity upgrades to I-70 are a top priority in the Kansas City District as well as across the State. The importance of the I-70 corridor to freight movement is echoed throughout all of the districts. Additional lanes were suggested to provide better reliability along the corridor. Other top priority corridors identified included I-49 and the south leg of I-435.
- Private sector engagement is a crucial part of crafting a meaningful freight plan. Stakeholders suggest that key businesses, including railroads, should be brought into crafting the plan and that the best way to do that is through cultivating relationships and building trust. In addition, information on private sector freight movements that has not been available in the past is needed for a complete freight picture and a plan that enhances economic development in the State.
- The increase in the use of e-commerce is changing the way that freight stakeholders conduct business and will require a freight system that accommodates that shift. Stakeholders pointed out that more distribution centers will lead to greater pressure on roadways.

St. Louis District

- St. Louis is challenged to compete as a freight hub, and focus should be placed on developing opportunities for intermodal activities and international export. Stakeholders said transforming St. Louis to a major freight hub status is needed to grow the regional economy. While “St. Louis tends to be a pass-through,” there are opportunities to develop additional facilities, particularly as an alternate freight hub to Chicago, which is highly congested. Stakeholders would like the public to be better informed on how freight transportation infrastructure supports the economy and jobs.
- Congestion on I-70 and I-44 causes costly delays and some safety concerns.
- It is difficult to move freight from ports and airports directly to destinations. Better connectivity is needed between the freight modes. Stakeholders are concerned about the difficulty businesses have in making the “last-mile connections.” This issue was recently raised when trying to attract large economic development deals to the region.

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- Air cargo facilities are available at Lambert Airport, but they are dated and small. Upgrades and expansion efforts are needed for air cargo capacity growth in the District.
- Deficient bridges in the district could cause costly delays and pose safety concerns for carriers.
- There is a shortage of available motor carriers and truck fleets as it is becoming increasingly difficult to recruit and insure drivers, and many fleets have left St. Louis. These shortages are driving up costs to move freight on roadways.

Central District

- Innovative funding options should continue to be explored. Stakeholders in this district are concerned that funding gaps are threatening programs that are working well, such as MoDOT's cost share program.
- Efforts should be made to improve connectivity throughout the district. Stakeholders identified a need for improving north-south connections and specifically noted concerns with US-63 between Jefferson City and Rolla. The district could also benefit from improvements to I-70, such as increased lanes, as the interstate is critical to moving freight and supporting the agriculture industry. Several stakeholders suggested that a multi-modal hub between Columbia and Jefferson City would support economic development in the district.
- The Missouri River is under-utilized and under-marketed. Stakeholders recognize that the district should expect increased demand over the next five years and beyond. Utilizing waterways will be critical in effectively moving additional freight and taking strain off of highways and rail lines.
- The freight system needs to support the agriculture industry, which is key to the economic success of the district and the State.

As one stakeholder noted, "2014 agriculture industry technology is being moved on a 1940's (freight) network."

Figure D-3: Stakeholders and MoDOT come together in MoDOT's Southwest District to discuss strategic freight investments.

Southwest District

- Interstate capacity upgrades are needed. Many stakeholders suggested adding lanes to I-70 and I-44. "I-44 is aging out and will need additional capacity as the population increases in the region." Congestion on these interstate corridors is a top concern for many, especially in urban areas. One stakeholder recommended completing I-49 to the Arkansas state line.
- Motor carrier accommodation and recruitment is a high priority in this district. A recurring theme from stakeholders is the need for better accommodations for motor carriers, such as



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improved and larger rest areas. In addition, stakeholders are interested in motor carrier recruitment, driver training programs for the general public to increase safety on roadways, and less regulation on drivers.

- Funding programs for freight should be flexible so each district can target their specific needs, regardless of mode.

Southeast District

- East-west connectivity is limited regionally and a St. Louis bypass could help congestion. Capacity concerns in the St. Louis area led many stakeholders to suggest an east-west or diagonal corridor to provide "this area a direct route through central Missouri" as an alternative to the longer I-55/I-70 route. Another interviewee said Missouri "needs an 'X' through the middle of the state to connect southeast Missouri with Kansas City and Kirksville to Joplin and Springfield." Stakeholders also suggested a freeway-type roadway (i.e. four-laning US-60 across the state).
- US-67 is a key north-south connection, and completing the route through Arkansas would increase economic opportunities.
- Industry relies on secondary highways for time-sensitive delivery and connections to interstates, and the condition of these roadways could be improved. Several stakeholders suggested resurfacing and capacity upgrades.
- Stakeholders are concerned about funding for ports and waters for small-level capital projects. Additionally, several stakeholders commented about the need for consistent support of harbor dredging.

Additional Communication Tools and Outreach Efforts

- MoDOT worked to broaden and update its freight stakeholder database throughout the life of the project and added new key stakeholders. There are over 1,300 entries.
- Project email blasts were sent throughout the project, inviting key stakeholders to participate in forums and surveys.
- An interactive website and social media accounts were maintained throughout the project and included invites to events, press releases and project materials. The website address is MOFreightPlan.org and the twitter handle is @mofreightplan. As of the end of July the website received over 3,000 total page views.
- Several short videos were created by MoDOT during the project and focused on providing project information and drawing the link between freight and economic developments.

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Deepen Stakeholder Connections

Grassroots Outreach

MoDOT also reached out to motor carriers, shippers and receivers in the state to gather input via an electronic survey. Because the response rate was limited, MoDOT began reaching out directly to freight-orientated groups and associations to hear members' thoughts and concerns regarding the freight plan. Presentations were made to groups and surveys were provided.

The groups include:

- Mid Missouri Regional Planning Commission
- Missouri Chamber of Commerce and Industry
- Springfield Area Chamber of Commerce
- Greater Kansas City Chamber of Commerce
- Missouri Trucking Association
- Missouri Chapter of Association of American Railroads
- Council of Supply Chain Management-St. Louis
- St. Joseph Chamber of Commerce
- Consortium for Supply Chain Management Studies
- Transportation Club of St. Louis
- Inland Rivers, Ports and Terminals (IRPT)
- Joplin Diplomats
- Springfield Motor Carriers
- Transportation Engineers Association of Missouri (TEAM)
- KC Aviation Department

Figure D-4: Stakeholders talk about investments in all modes in St. Louis



Regional Priorities and Investment Forums (April-May 2014)

Close to 100 stakeholders participated in three regional forums held in Kansas City, St. Louis and Springfield. A statewide focused webinar was also held in early May for those stakeholders who were not able to participate in any of the three regional forums.

The primary question stakeholders were asked to help answer was: How can MoDOT best prioritize investments to achieve the freight network goals?

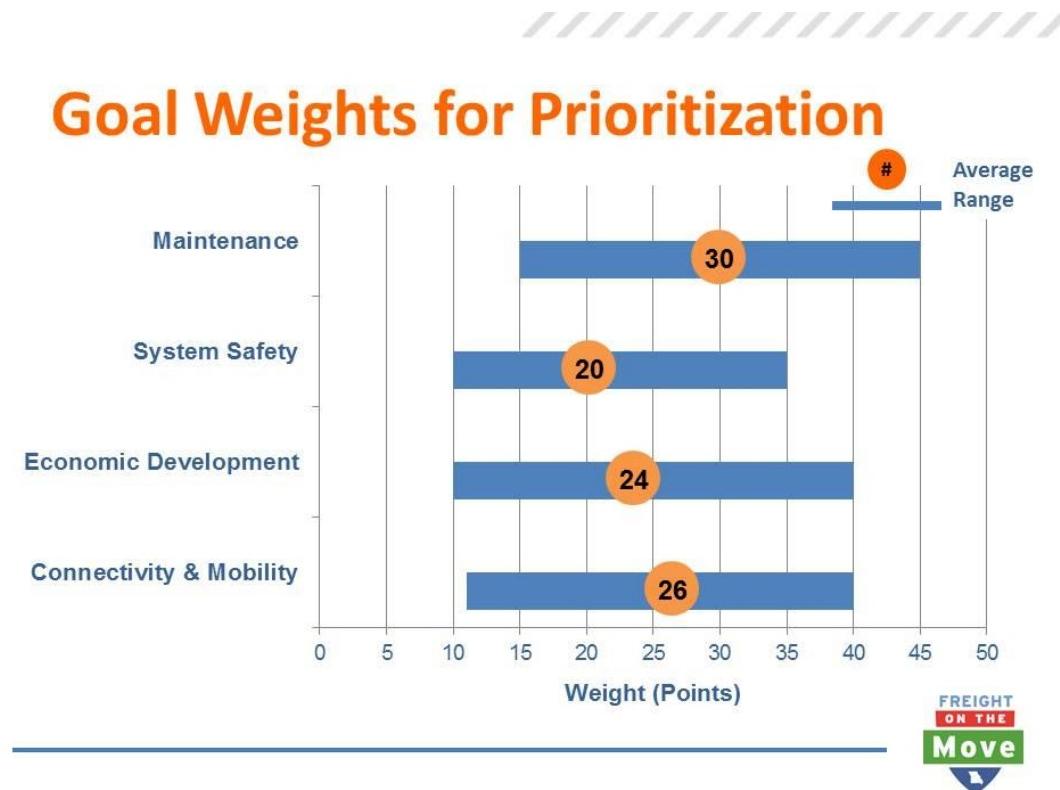
To answer that question, MoDOT provided stakeholders with information about the current condition of the freight network. Then stakeholders were asked what freight assets are needed today and in the future to be more competitive. Three interactive exercises were completed within a small breakout group format during the forums so that stakeholders could provide guidance to MoDOT on how to best prioritize freight improvement projects.

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First, small groups discussed how goals for the freight plan, which are aligned with MoDOT's long range transportation plan goals, should be prioritized and weighted when considering freight projects. Those goals are maintenance, system safety, economic development, and connectivity and mobility.

The statewide average weight for each goal is identified in the orange circle in **Figure D-5**. The blue bar represents the range of weights assigned to each goal by the small groups across the State.

Figure D-5: Stakeholders assigned goal weights for project prioritization



The small groups were then asked to weight the filters (or selection criteria) that would be used to prioritize freight improvement projects for each goal. Those filters are identified by goal below and results are provided in **Figure D-6**:

Maintenance Filter:

- Maintains the existing freight network.

System Safety Filter:

- Improves a high crash location.

Economic Development Filters

- On a link of high economic value.

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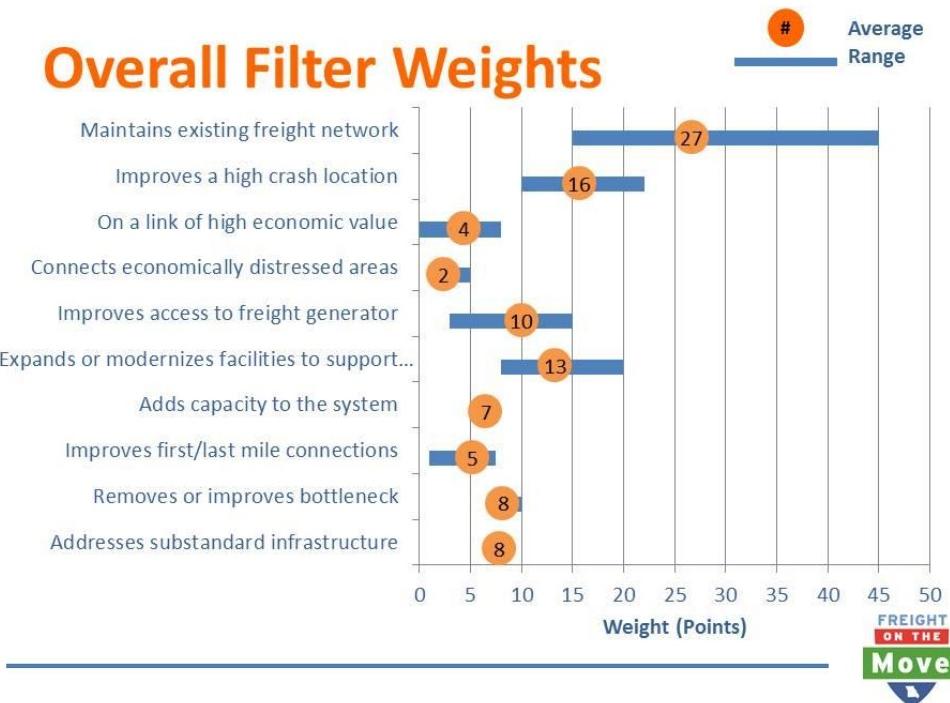
- Connects economically distressed areas.
- Improves access to freight generator.
- Expands or modernizes facilities to support freight.
- Adds capacity to the system.

Connectivity and Mobility Filters

- Improves first/last mile connections.
- Removes or improves bottlenecks.
- Addresses substandard infrastructure.

Figure D-6 provides the average weighting statewide for each filter (or criterion). Like **Figure D-5** above, the number in the orange circle represents the statewide average and the blue bar represents the range of weights for each criterion.

Figure D-6: Stakeholders assigned filters and weights for each of the goals for project prioritization.



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Stakeholder Comment Period (October 2014)

A draft State Freight Plan was available for public comment from October 1 to 31, 2014. Stakeholders submitted 80 comments during this time via the following outreach activities:

- An online survey targeting key stakeholders was posted on the State Freight Plan website to gather input about the draft plan. Nineteen responses were received. A copy of the survey and the responses are provided in Attachment 15.
- Outreach events were held and project team members facilitated discussions and presented information on this plan. A list of the outreach events is provided in Attachment 16.
- A webinar presenting highlights from the plan was held on October 19 during which participants could provide comments. The presentation used during the webinar was posted to the project website and is available in Attachment 17.

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Attachments:

Interviews/Surveys

1. Freight Industry Survey
2. Community Leaders Survey
3. Motor Carriers, Shippers and Recievers Survey
4. General Stakeholder/MoFreight.com Survey

Freight Forum Presentation

5. Statewide Presentation

District Freight Forum Summaries

6. Central District
7. Kansas City District
8. Northeast District
9. Northwest District
10. St. Louis District
11. Southeast District
12. Southwest District

Priorities and Investment Forum Presentation

13. Statewide Presentation

Business Forum Summary

14. Final Document

Stakeholder Comment Period

15. Stakeholder Survey
16. Outreach Events
17. Webinar Presentation
18. Draft Plan Comments

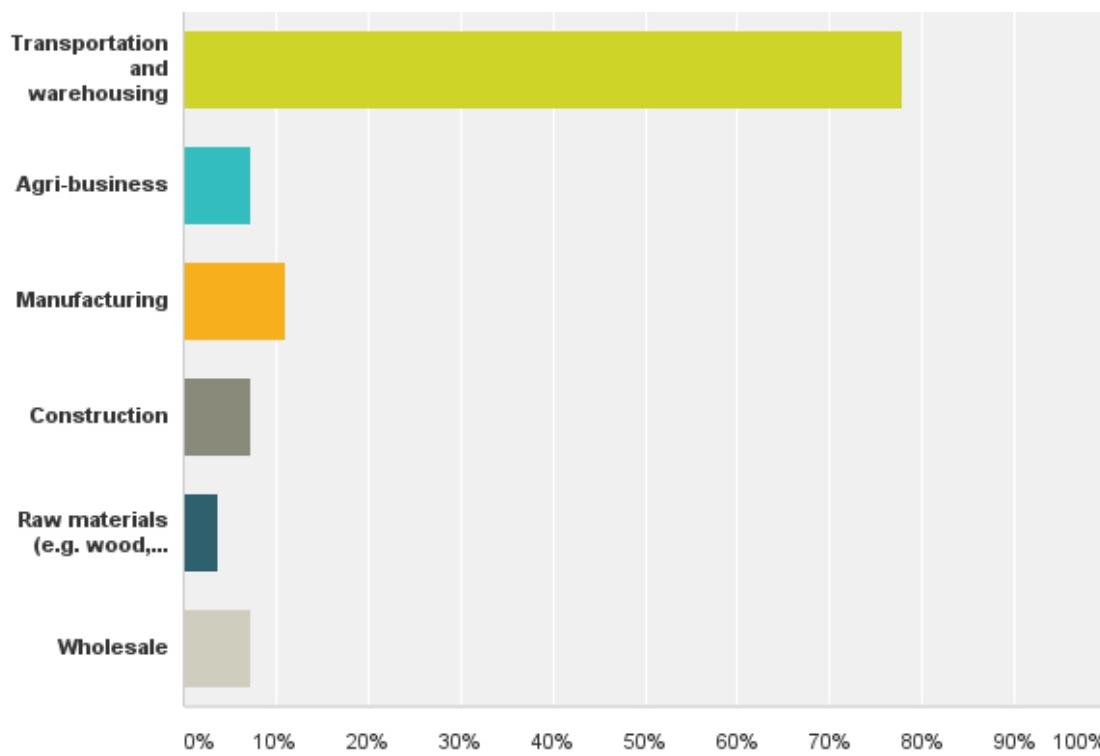
Appendix D - Stakeholder Outreach

Stakeholder Interviews/Surveys

ATTACHMENT 1: Freight Industry Surveys and Responses: 33 total responses

Q2: Please describe your business sector(s). Choose all that are applicable.

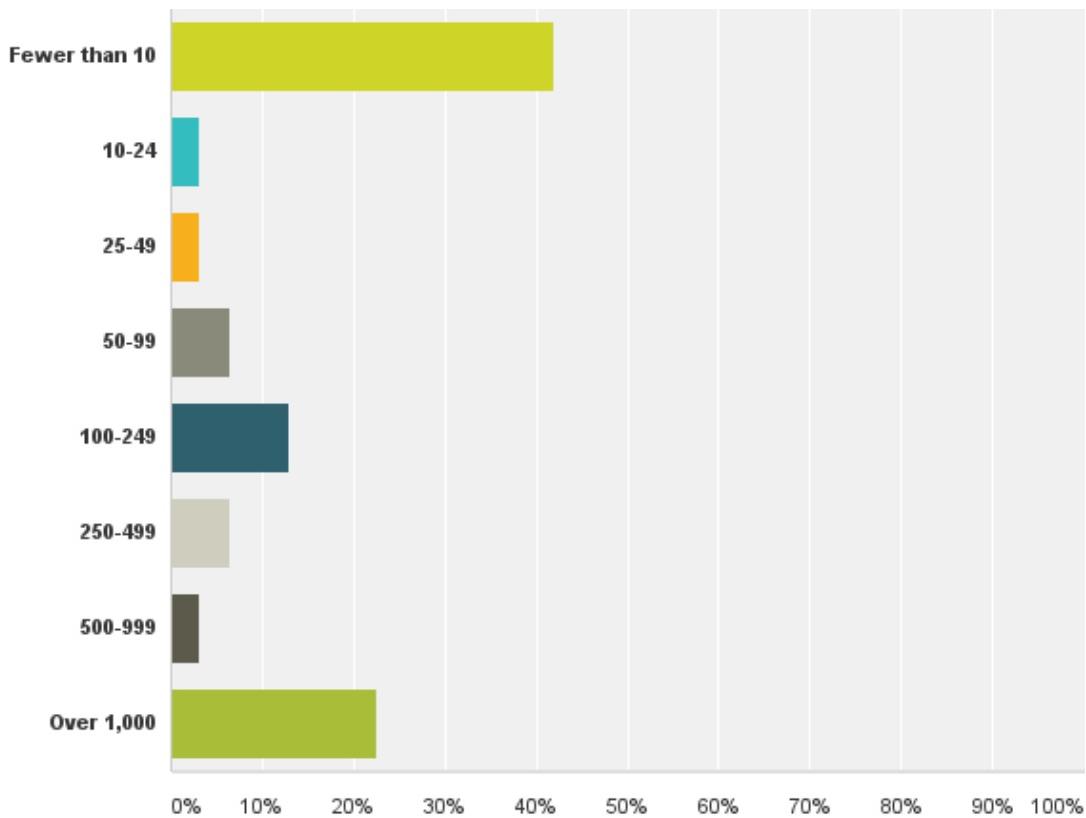
Answer Choices	Responses	
Transportation and warehousing	77.78%	21
Agri-business	7.41%	2
Manufacturing	11.11%	3
Construction	7.41%	2
Raw materials (e.g. wood, stone, oil)	3.70%	1
Wholesale	7.41%	2
Total Respondents: 27		



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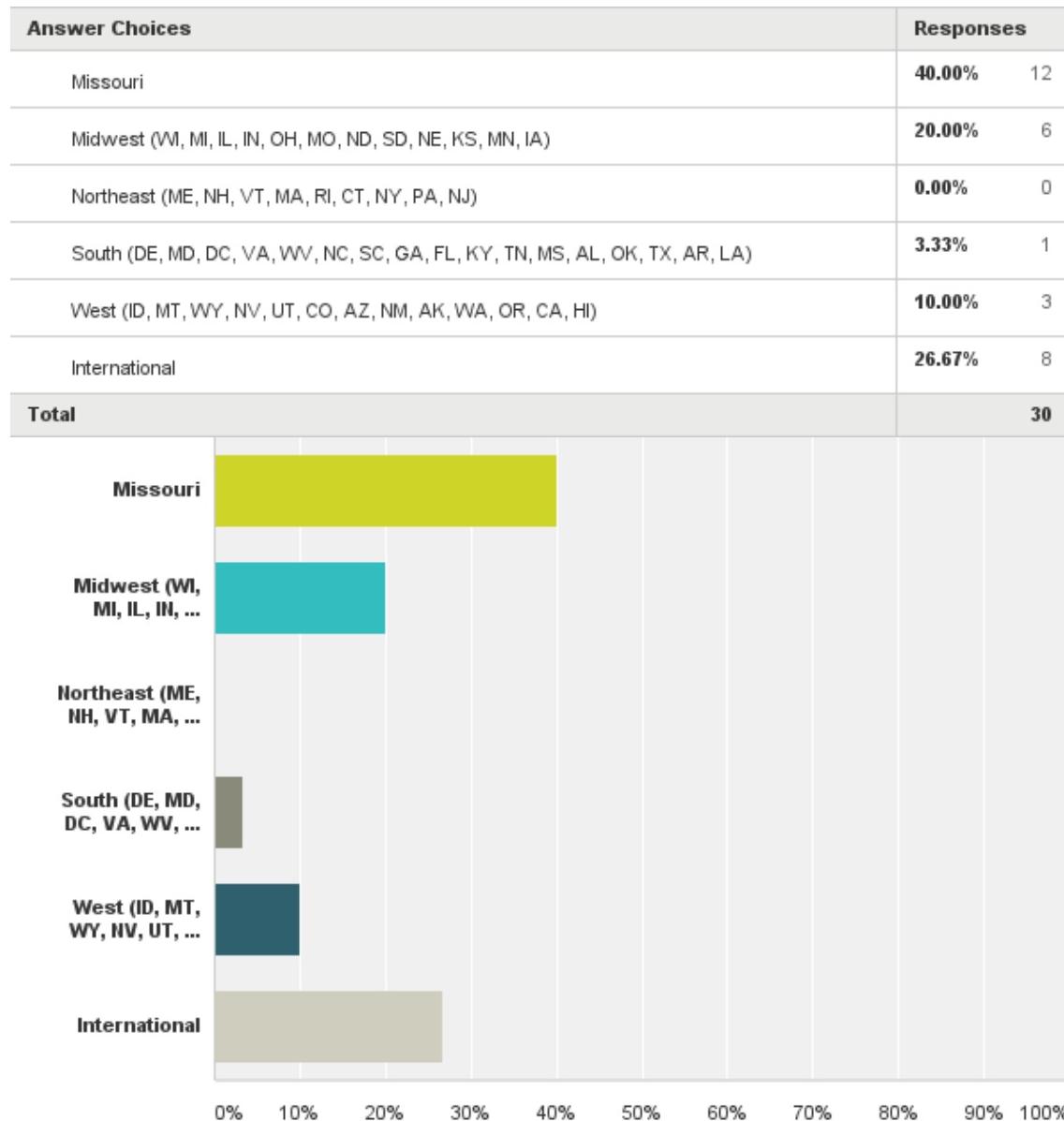
Q5: How many employees do you have in Missouri?

Answer Choices	Responses	
Fewer than 10	41.94%	13
10-24	3.23%	1
25-49	3.23%	1
50-99	6.45%	2
100-249	12.90%	4
250-499	6.45%	2
500-999	3.23%	1
Over 1,000	22.58%	7
Total		31



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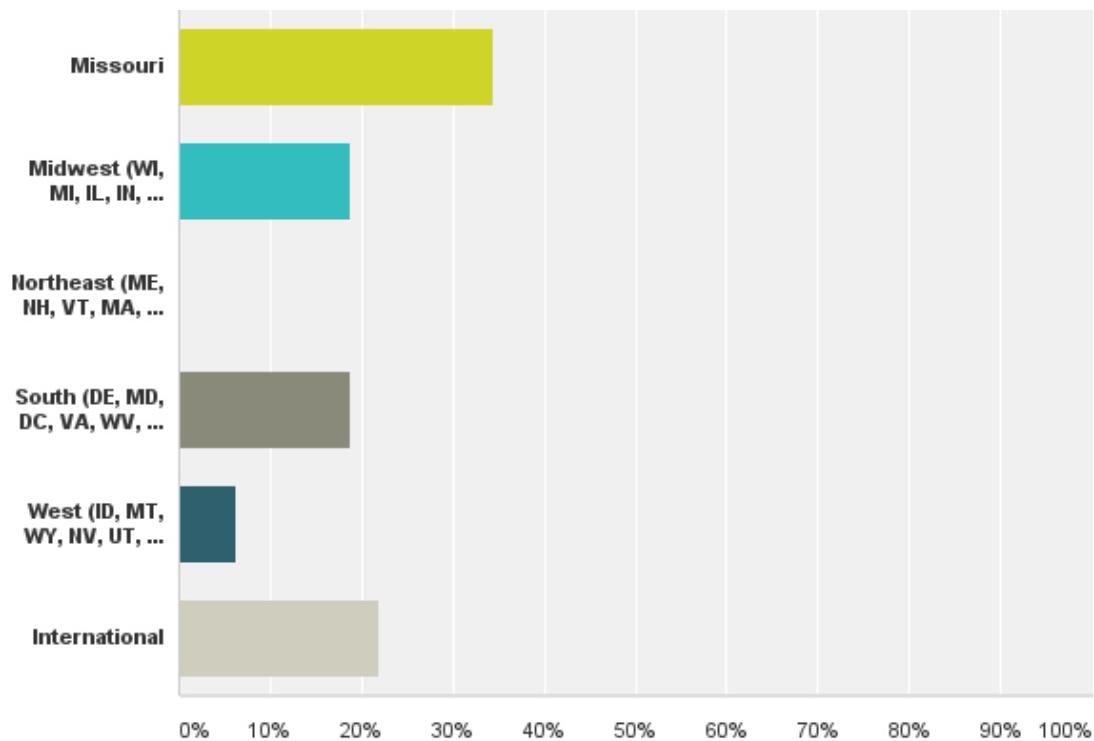
Q7: Where are your suppliers primarily located?



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Q8: Where are your customers primarily located?

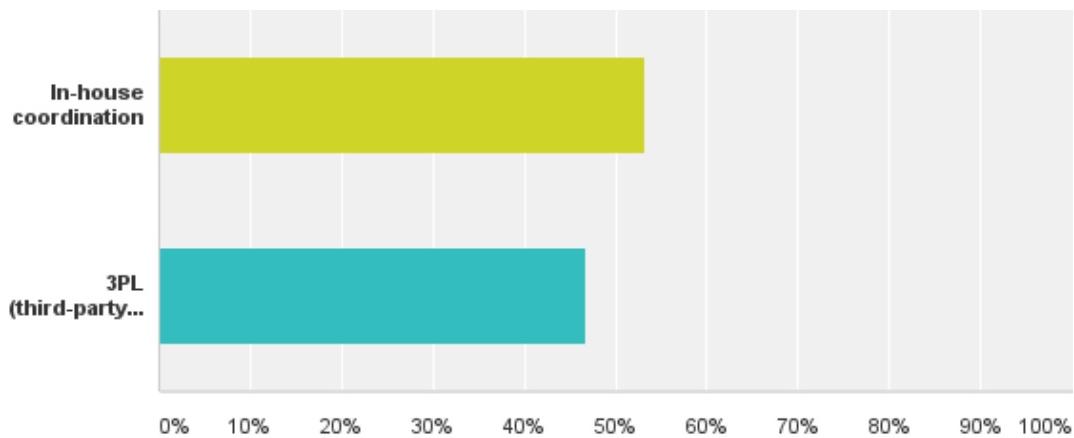
Answer Choices	Responses	
Missouri	34.38%	11
Midwest (WI, MI, IL, IN, OH, MO, ND, SD, NE, KS, MN, IA)	18.75%	6
Northeast (ME, NH, VT, MA, RI, CT, NY, PA, NJ)	0.00%	0
South (DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, MS, AL, OK, TX, AR, LA)	18.75%	6
West (ID, MT, WY, NV, UT, CO, AZ, NM, AK, WA, OR, CA, HI)	6.25%	2
International	21.88%	7
Total	32	



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Q9: Please describe your overall logistics operations.

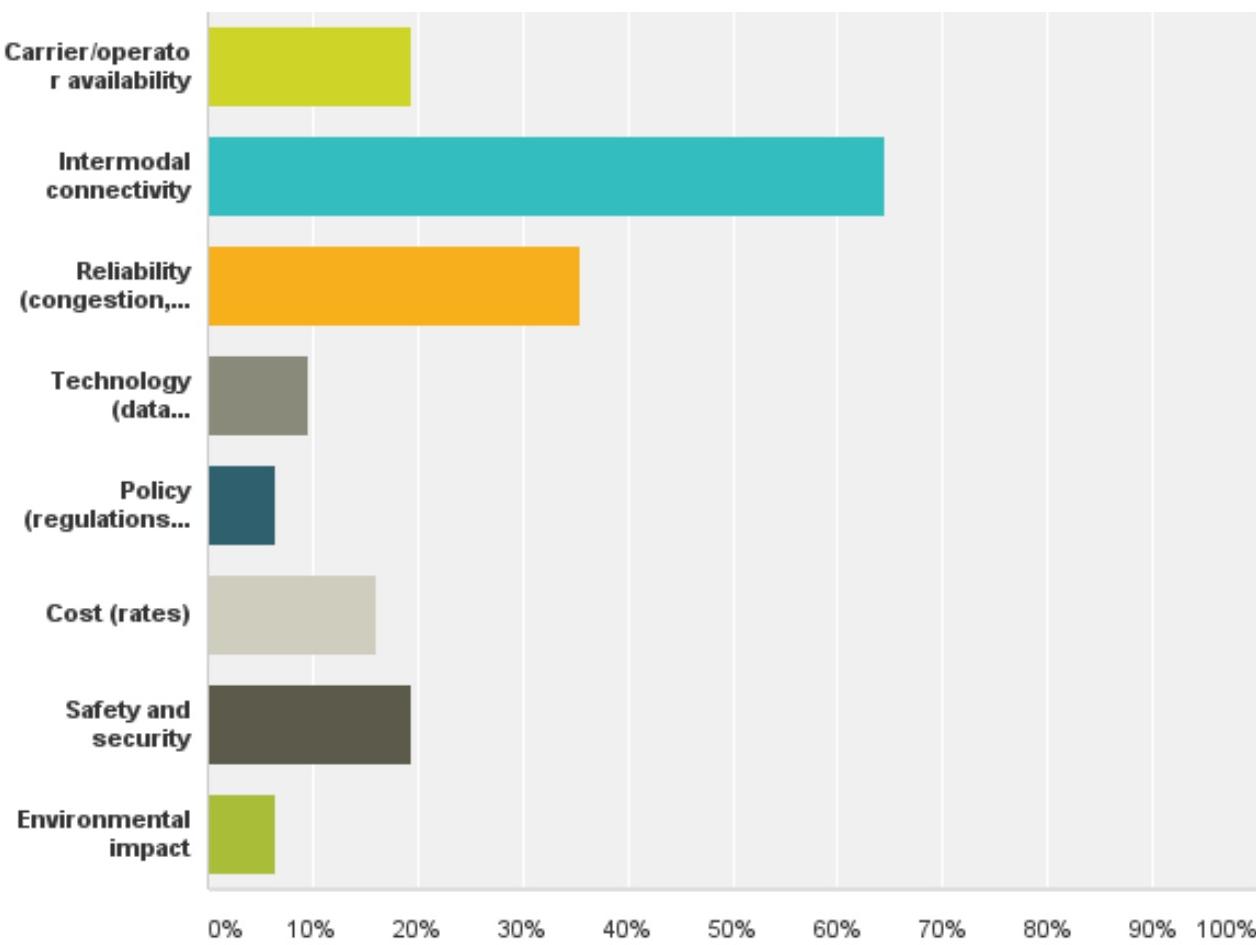
Answer Choices	Responses	
In-house coordination	53.33%	16
3PL (third-party logistics provider)	46.67%	14
Total	30	



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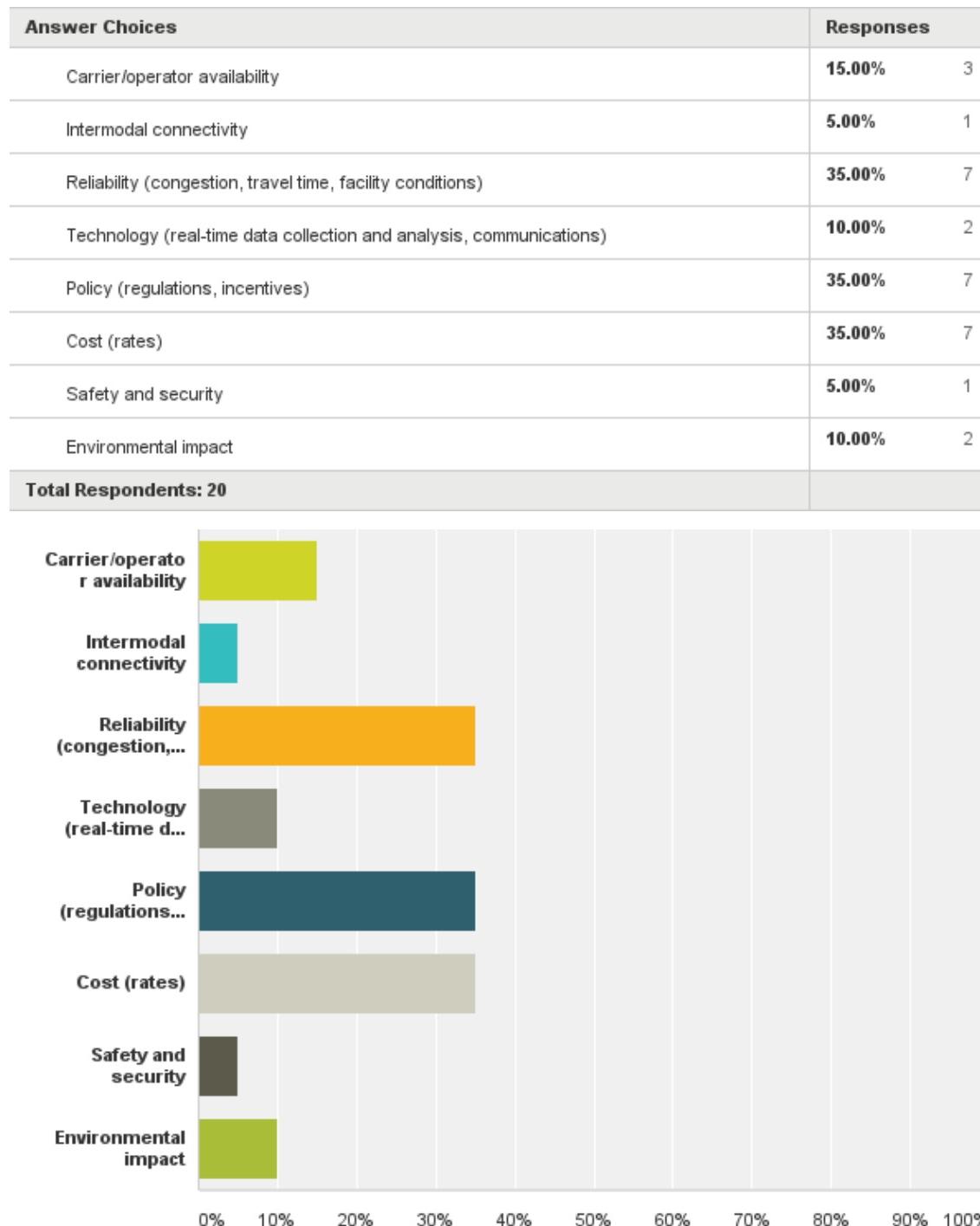
Q10: What are the greatest strengths of Missouri's freight system? Please select up to THREE options.

Answer Choices	Responses	
Carrier/operator availability	19.35%	6
Intermodal connectivity	64.52%	20
Reliability (congestion, travel time, facility conditions)	35.48%	11
Technology (data collection and analysis, communications)	9.68%	3
Policy (regulations, incentives)	6.45%	2
Cost (rates)	16.13%	5
Safety and security	19.35%	6
Environmental impact	6.45%	2
Total Respondents: 31		



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Q11: What are the biggest challenges for Missouri freight in the next 5 to 10 years? Please select up to THREE options.



Appendix D - Stakeholder Outreach

Q13: How important is freight to the Missouri economy?

	Not very important	Somewhat important	Very important	No opinion	Total	Average Rating
(no label)	0.00% 0	0.00% 0	100.00% 32	0.00% 0	32	3.00

Q14: May we contact you about future opportunities to participate in the Missouri State Freight Plan?

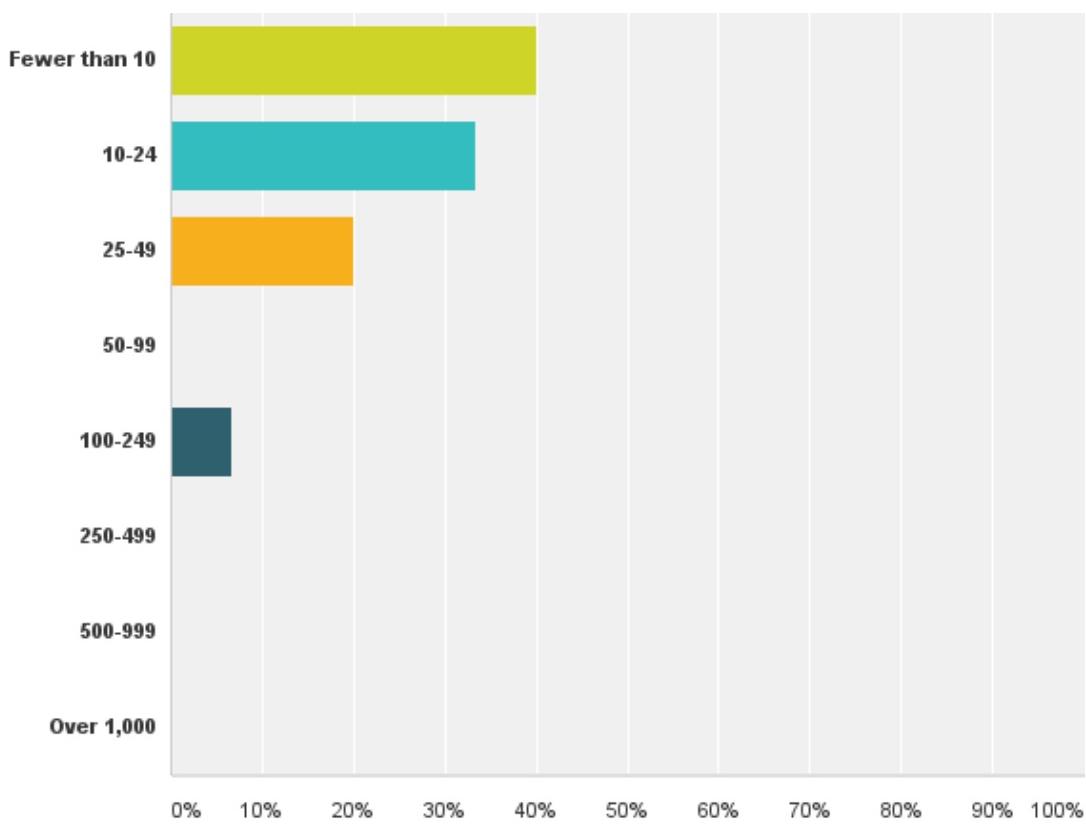
Answer Choices	Responses	
Yes	70.00%	21
No	30.00%	9
Total		30

Appendix D - Stakeholder Outreach

ATTACHMENT 2: Community Leaders Interview/Survey: 26 responses

Q3: How many employees do you have in Missouri?

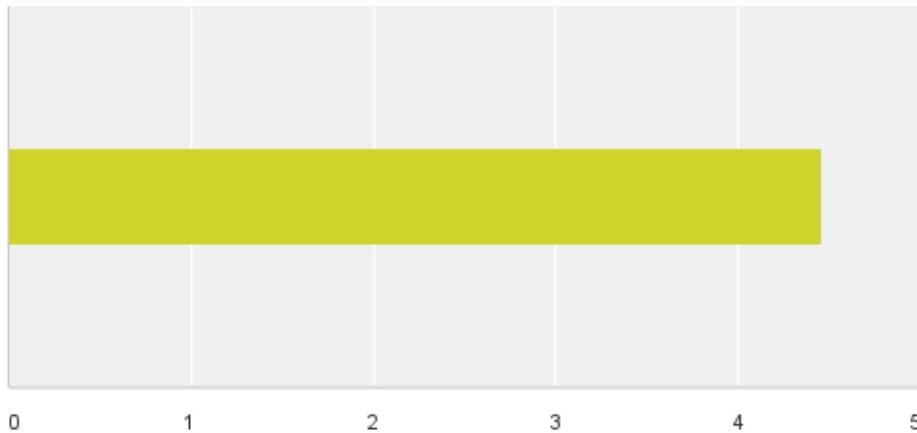
Answer Choices	Responses	
Fewer than 10	40.00%	6
10-24	33.33%	5
25-49	20.00%	3
50-99	0.00%	0
100-249	6.67%	1
250-499	0.00%	0
500-999	0.00%	0
Over 1,000	0.00%	0
Total		15



Appendix D - Stakeholder Outreach

Appendix D - Stakeholder Outreach

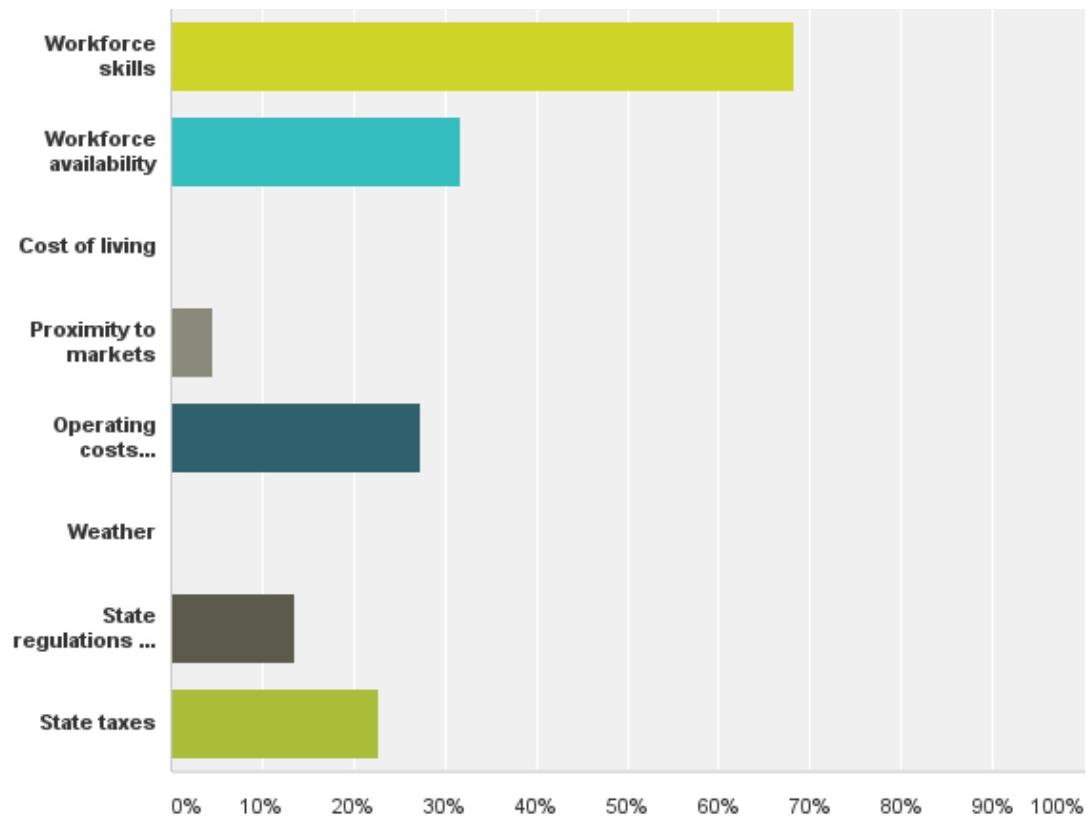
Q4: On a scale of 1 to 5, with 5 being the most important, please rate the importance of freight transportation in convincing businesses to come to or grow in Missouri.



1	2	3	4	5	No opinion	Total	Average Rating
0.00%	0.00%	0.00%	54.17%	45.83%	0.00%	24	4.46

Appendix D - Stakeholder Outreach

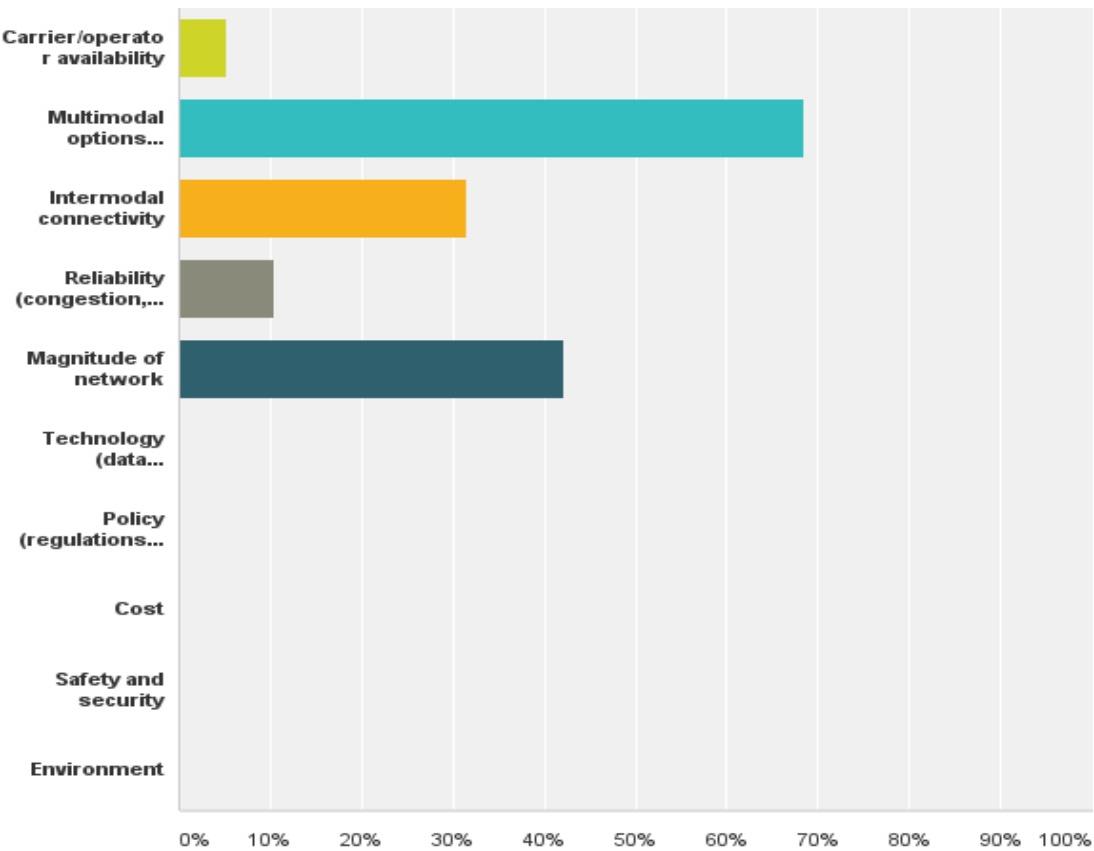
Q5: What factors are as important as or more important than freight transportation in convincing business to come to or grow in Missouri? Please choose all that apply



Answer Choices	Responses	
Workforce skills	68.18%	15
Workforce availability	31.82%	7
Cost of living	0.00%	0
Proximity to markets	4.55%	1
Operating costs (utilities, land, etc.)	27.27%	6
Weather	0.00%	0
State regulations and policies	13.64%	3
State taxes	22.73%	5
Total Respondents: 22		

Appendix D - Stakeholder Outreach

Q6: What are the greatest strengths of Missouri's freight system? Please select up to THREE options.

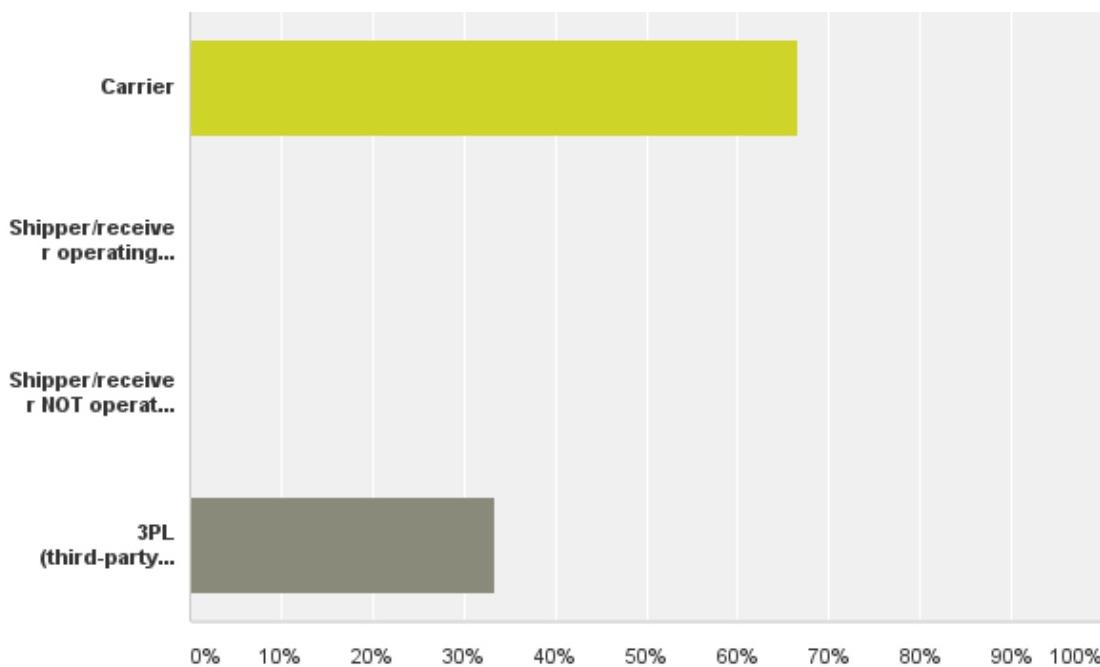


Appendix D - Stakeholder Outreach

Answer Choices	Responses	
Carrier/operator availability	5.26%	1
Multimodal options (freight diversity)	68.42%	13
Intermodal connectivity	31.58%	6
Reliability (congestion, travel time, facility conditions)	10.53%	2
Magnitude of network	42.11%	8
Technology (data collection and analysis, communications)	0.00%	0
Policy (regulations, incentives)	0.00%	0
Cost	0.00%	0
Safety and security	0.00%	0
Environment	0.00%	0
Total Respondents: 19		

ATTACHMENT 3: Motor Carriers, Shippers and Receivers Interviews/Surveys: 3 responses

Q1: Please describe your overall business model.



Appendix D - Stakeholder Outreach

Answer Choices	Responses	
Carrier	66.67%	2
Shipper/receiver operating private fleet	0.00%	0
Shipper/receiver NOT operating private fleet	0.00%	0
3PL (third-party logistics provider)	33.33%	1
Total		3

Appendix D - Stakeholder Outreach

Q2: Please describe the business sector(s) you serve. Choose all that are applicable.

Answer Choices	Responses	
Transportation and warehousing	0.00%	0
Agri-business	0.00%	0
Manufacturing	0.00%	0
Construction	0.00%	0
Raw materials (e.g. wood, stone, oil)	0.00%	0
Wholesale	0.00%	0
Total Respondents: 0		

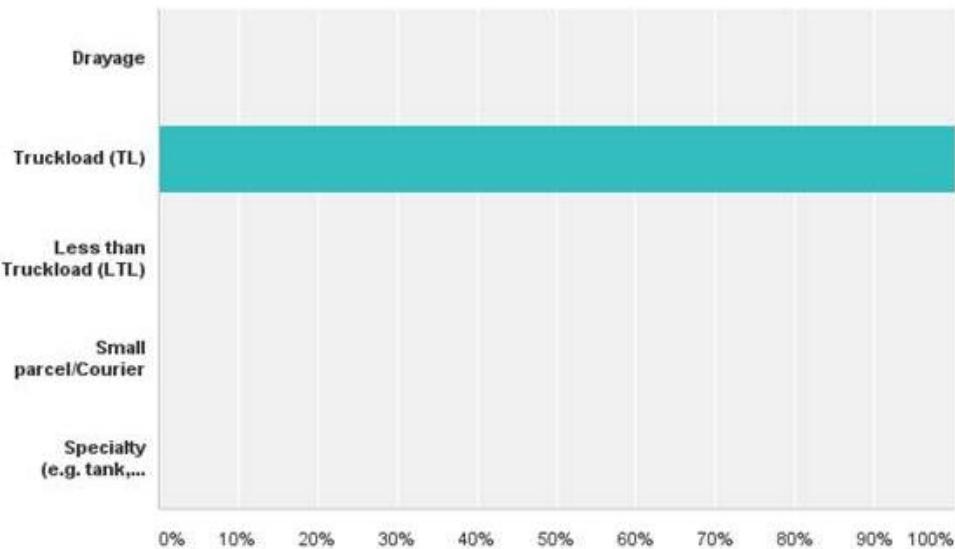
applicable.

Answer Choices	Responses	
Fewer than 10	0.00%	0
10-24	0.00%	0
25-49	0.00%	0
50-99	0.00%	0
100-249	0.00%	0
250-499	0.00%	0
500-999	0.00%	0
Over 1,000	0.00%	0
Total		0

Q5: How many employees do you have in Missouri?

Appendix D - Stakeholder Outreach

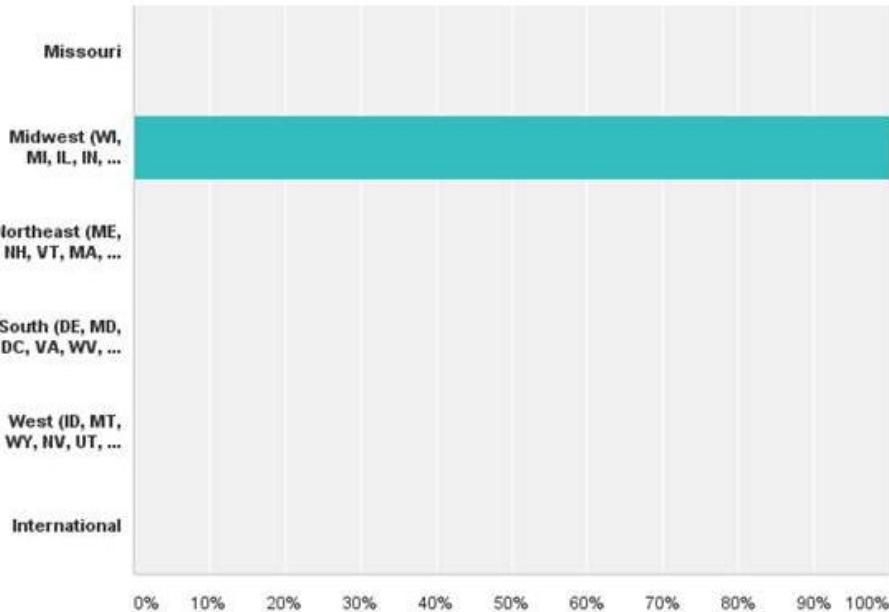
Q7: MOTOR CARRIERS: Which industry segment best represents your operations?



Answer Choices	Responses	
Drayage	0.00%	0
Truckload (TL)	100.00%	1
Less than Truckload (LTL)	0.00%	0
Small parcel/Courier	0.00%	0
Specialty (e.g. tank, heavy haul, refrigerated)	0.00%	0
Total		1

Appendix D - Stakeholder Outreach

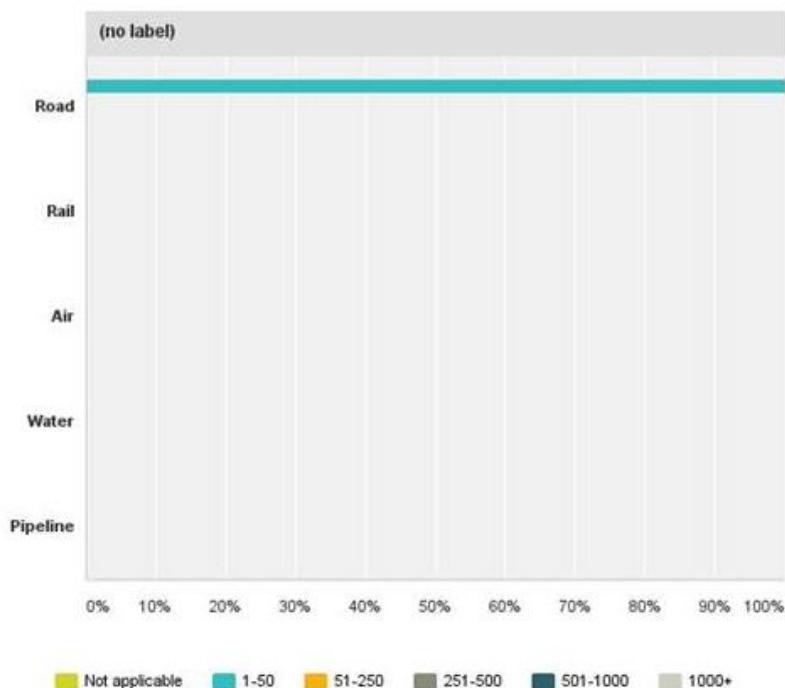
Q8: ALL: What region best describes your operational coverage?



Answer Choices	Responses	
Missouri	0.00%	0
Midwest (WI, MI, IL, IN, OH, MO, ND, SD, NE, KS, MN, IA)	100.00%	1
Northeast (ME, NH, VT, MA, RI, CT, NY, PA, NJ)	0.00%	0
South (DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, MS, AL, OK, TX, AR, LA)	0.00%	0
West (ID, MT, WY, NV, UT, CO, AZ, NM, AK, WA, OR, CA, HI)	0.00%	0
International	0.00%	0
Total	1	

Appendix D - Stakeholder Outreach

Q9: ALL: What is the total number of power units in your fleet, by mode? (i.e. tractors, engines, ships, planes)



Appendix D - Stakeholder Outreach

Q10: ALL: What percent of your fleet operates in Missouri?

Answer Choices	Responses	
1-25%	0.00%	0
26-50%	100.00%	1
51-75%	0.00%	0
76-99%	0.00%	0
100%	0.00%	0
Total		1

Q11: ALL: What freight corridors to you operate on?

Answer Choices	Responses	
Road: Interstates	100.00%	1
Road: State highways	100.00%	1
Road: Local roads	100.00%	1
Water: Missouri River	0.00%	0
Water: Mississippi River	0.00%	0
Rail: Class I	0.00%	0
Rail: Shortline	0.00%	0
Air	0.00%	0
Pipeline	0.00%	0
Total Respondents: 1		

Appendix D - Stakeholder Outreach

Q12: AIR CARRIERS: What is your annual air cargo tonnage?

Answer Choices	Average Number	Total Number	Responses
Annual air cargo tonnage:	0	0	0
Total Respondents: 0			

Q13: ALL: What percent of your shipments are domestic versus international?

Answer Choices	Average Number	Total Number	Responses
Domestic:	90	90	1
International:	0	0	0
Total Respondents: 1			

Please leave off the percent symbol when entering answers (i.e. use "50" for 50%).

Q14: How many facilities do you operate in Missouri?

Answer Choices	Average Number	Total Number	Responses
Facilities in MO:	0	0	0
Total Respondents: 0			

Appendix D - Stakeholder Outreach

Appendix D - Stakeholder Outreach

Q15: CURRENTLY, how do you utilize each mode of freight transportation?

	0%	1-25%	26-50%	51-75%	76-99%	100%	Total
Road	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Rail	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Air	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Water	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Pipeline	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1

Q16: In the NEXT 3 TO 5 YEARS, how do you plan to utilize each mode of freight transportation?

	0%	1-25%	26-50%	51-75%	76-99%	100%	Total
Road	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Rail	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Air	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Water	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
Pipeline	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1

Appendix D - Stakeholder Outreach

Q17: Please rate your overall satisfaction or dissatisfaction with Missouri's freight network by mode.

	Very dissatisfied	Dissatisfied	Satisfied	Very satisfied	Not applicable	Total	Average Rating
Road	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1	3.00
Rail	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1	3.00
Air	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1	0.00
Water	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1	0.00
Pipeline	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2	4.00

Q18: What are the greatest strengths of Missouri's freight system? Please select up to THREE options.

Answer Choices	Responses
Carrier/operator availability	0.00% 0
Multimodal options (freight diversity)	50.00% 1
Intermodal connectivity	0.00% 0
Reliability (congestion, travel time, facility conditions)	50.00% 1
Magnitude of freight network	50.00% 1
Technology (data collection and analysis, communications)	0.00% 0
Policy (regulations, incentives)	50.00% 1
Cost (rates)	0.00% 0
Safety and security	0.00% 0
Environmental impact	0.00% 0
Total Respondents: 2	

Appendix D - Stakeholder Outreach

Q19: What are the biggest challenges for Missouri freight in the next 5 to 10 years? Please select up to THREE options.

Answer Choices	Responses	
Carrier/operator availability	0.00%	0
Multimodal options (freight diversity)	0.00%	0
Intermodal connectivity	0.00%	0
Reliability (congestion, travel time, facility conditions)	0.00%	0
Magnitude of freight network	0.00%	0
Technology (data collection and analysis, communications)	0.00%	0
Policy (regulations, incentives)	50.00%	1
Cost (rates)	50.00%	1
Safety and security	0.00%	0
Environmental impact	100.00%	2
Total Respondents: 2		

Q21: How important is freight to the Missouri economy?

	Not very important	Somewhat important	Very important	No opinion	Total	Average Rating
(no label)	0.00% 0	50.00% 1	50.00% 1	0.00% 0	2	2.50

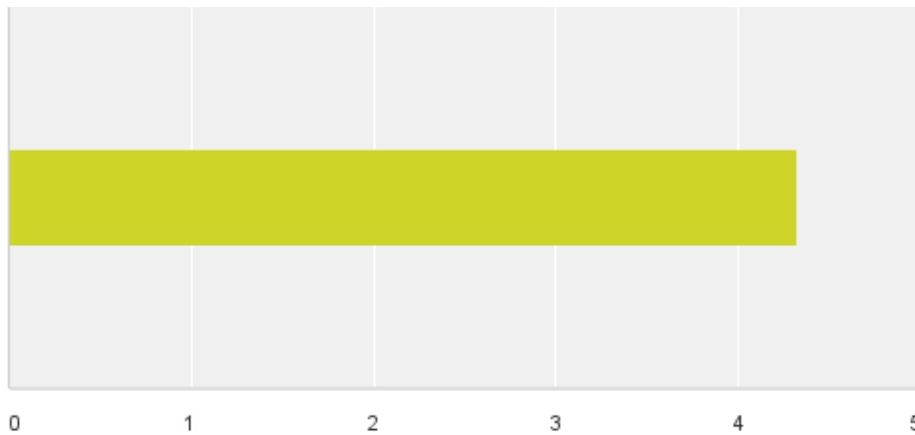
Appendix D - Stakeholder Outreach

Appendix D - Stakeholder Outreach

ATTACHMENT 4: MoFreightPlan.com Surveys: 101 total responses

Q2: On a scale of 1 to 5, with 5 being the most important, please rate the importance of freight transportation in attracting business to Missouri.

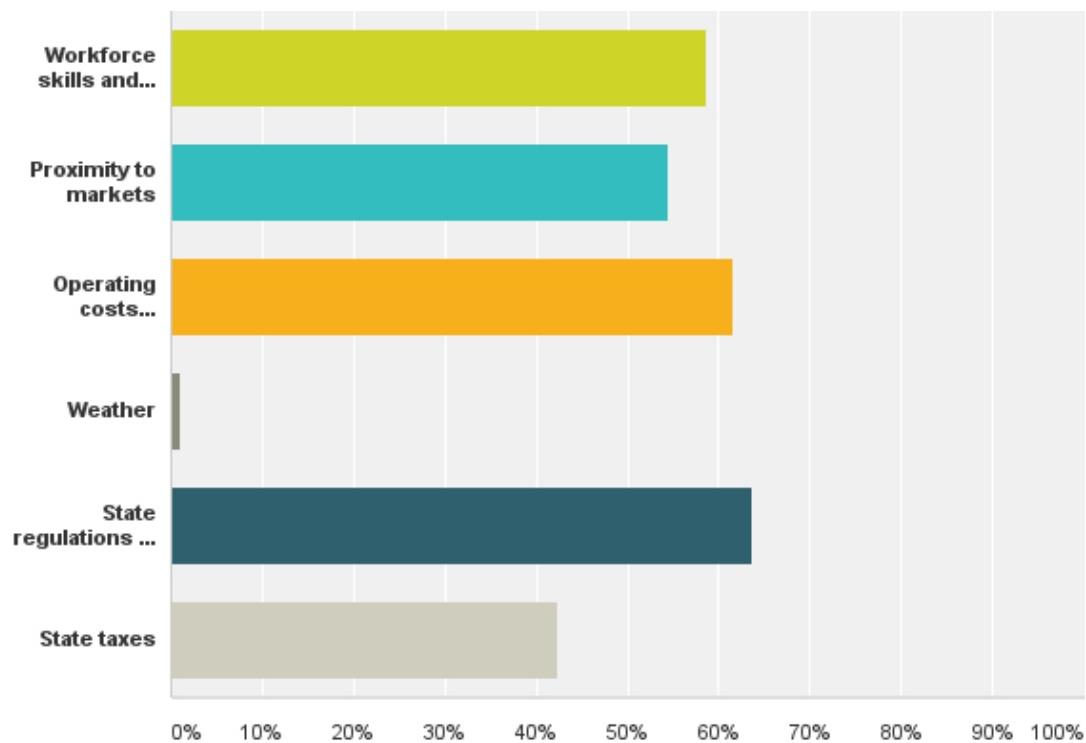
1	2	3	4	5	No opinion	Total	Average Rating
2.15% 2	3.23% 3	2.15% 2	44.09% 41	46.24% 43	2.15% 2	93	4.32



Appendix D - Stakeholder Outreach

Q3: What other factors are important to attracting business to Missouri?
Select up to three options.

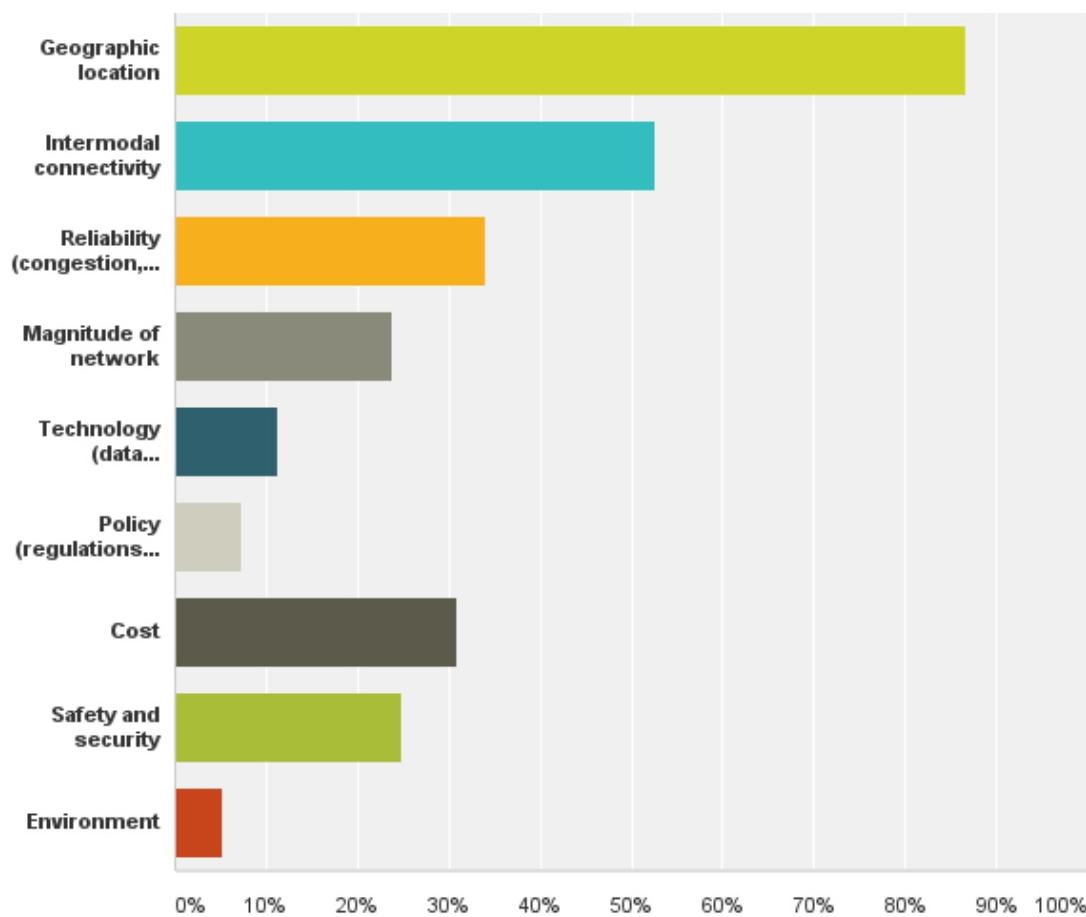
Answer Choices	Responses	
Workforce skills and availability	58.59%	58
Proximity to markets	54.55%	54
Operating costs (utilities, land, etc.)	61.62%	61
Weather	1.01%	1
State regulations and policies	63.64%	63
State taxes	42.42%	42
Total Respondents: 99		



Appendix D - Stakeholder Outreach

Q4: What are the greatest strengths of Missouri's freight system? Select all that apply.

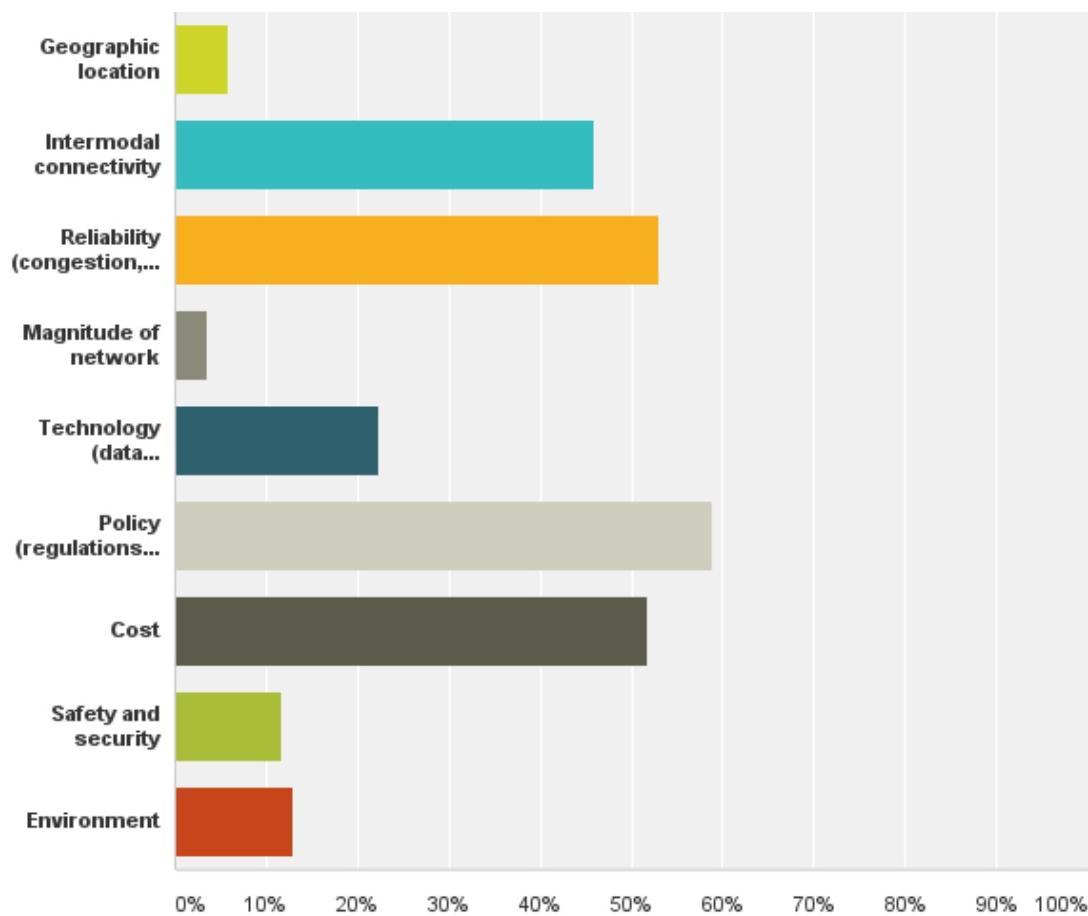
Answer Choices	Responses	
Geographic location	86.60%	84
Intermodal connectivity	52.58%	51
Reliability (congestion, travel time, facility conditions)	34.02%	33
Magnitude of network	23.71%	23
Technology (data collection and analysis, communications)	11.34%	11
Policy (regulations, incentives)	7.22%	7
Cost	30.93%	30
Safety and security	24.74%	24
Environment	5.15%	5
Total Respondents: 97		



Appendix D - Stakeholder Outreach

Q5: What are the biggest challenges for Missouri freight in the next 5 to 10 years? Select all that apply.

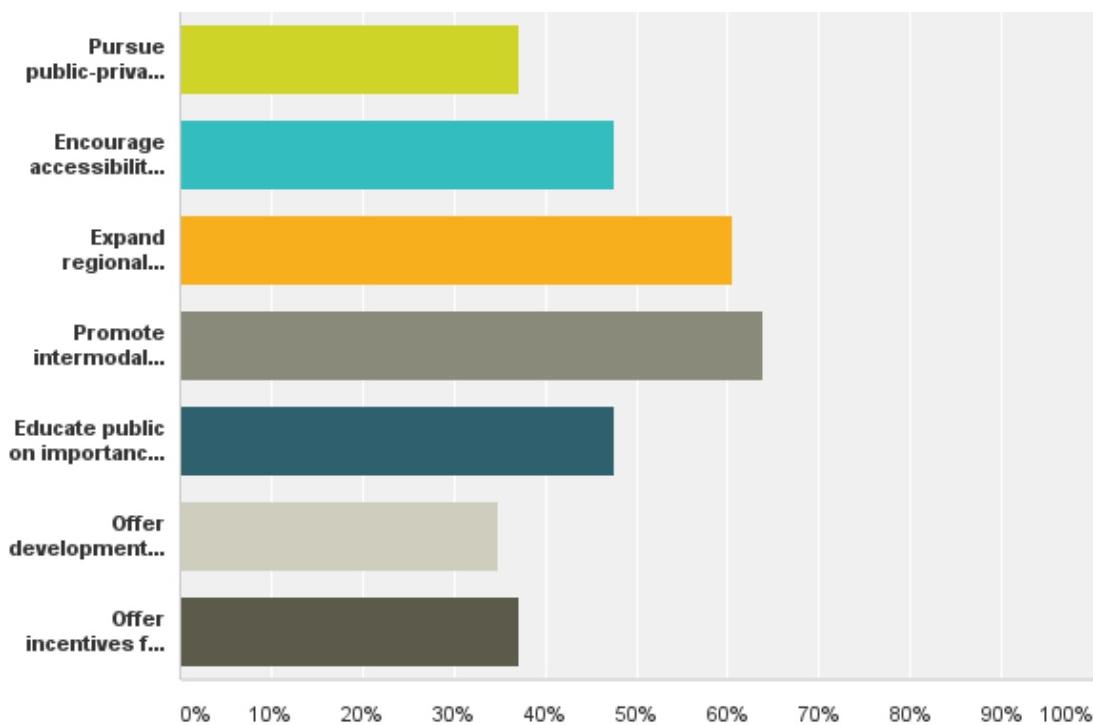
Answer Choices	Responses	
Geographic location	5.88%	5
Intermodal connectivity	45.88%	39
Reliability (congestion, travel time, facility conditions)	52.94%	45
Magnitude of network	3.53%	3
Technology (data collection and analysis, communications)	22.35%	19
Policy (regulations, incentives)	58.82%	50
Cost	51.76%	44
Safety and security	11.76%	10
Environment	12.94%	11
Total Respondents: 85		



Appendix D - Stakeholder Outreach

Q6: What strategies would you like to see utilized to promote freight transportation in Missouri? Select all that apply.

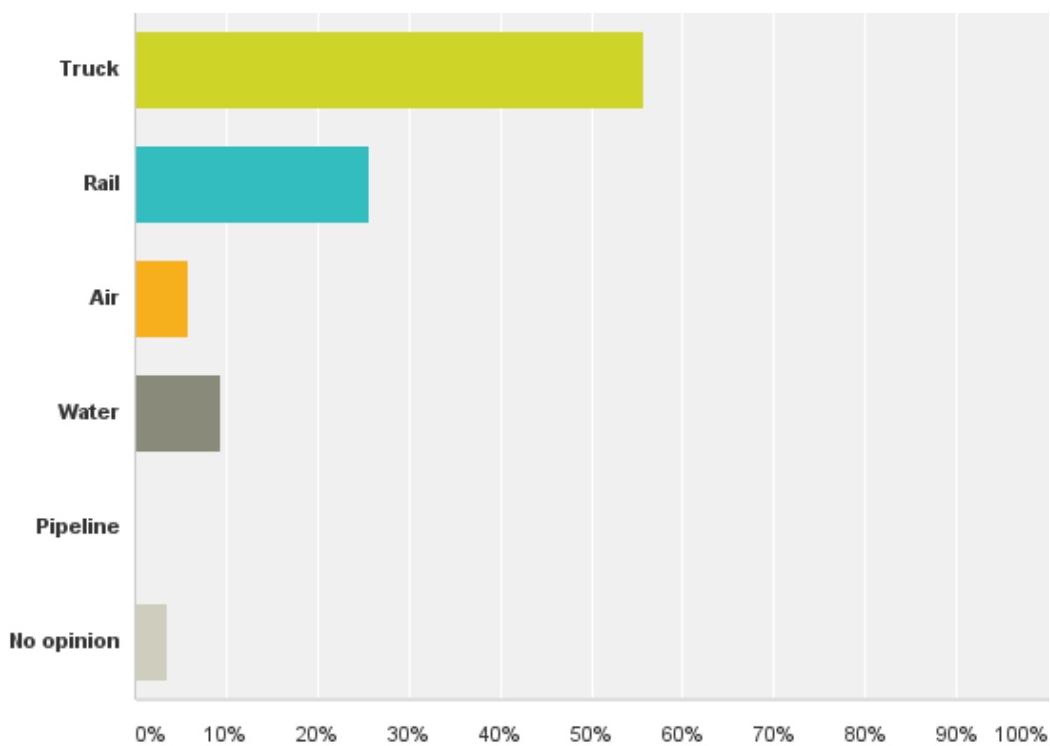
Answer Choices	Responses	
Pursue public-private partnerships (P3s)	37.21%	32
Encourage accessibility in planning process	47.67%	41
Expand regional capacity	60.47%	52
Promote intermodal connectivity	63.95%	55
Educate public on importance of MO freight	47.67%	41
Offer development incentives to freight users	34.88%	30
Offer incentives for enhancements to freight network efficiency and safety	37.21%	32
Total Respondents: 86		



Appendix D - Stakeholder Outreach

Q7: In the NEXT 5 YEARS, which freight mode do you expect will see the most growth in Missouri?

Answer Choices	Responses	
Truck	55.81%	48
Rail	25.58%	22
Air	5.81%	5
Water	9.30%	8
Pipeline	0.00%	0
No opinion	3.49%	3
Total		86



Appendix D - Stakeholder Outreach

Q9: May we contact you about future opportunities to participate in the Missouri Statewide Freight Plan?

Answer Choices	Responses	
Yes	72.73%	8
No	27.27%	3
Total		11

Freight Forum Presentation

ATTACHMENT 5: Statewide Presentation

Appendix D - Stakeholder Outreach



**FREIGHT
ON THE
Move**

Statewide Freight Forum
MoDOT Statewide Freight Plan

MoFreightPlan.org

2012 Missouri freight exports

\$13.9B



A Vision for Missouri's Transportation Future



Invest in projects that spur economic growth and create jobs

MissouriOnTheMove.org



On the Move goals

1. Take care of the transportation system
2. Keep all travelers safe, no matter the mode of transportation
3. Invest in projects that spur economic growth and create jobs
4. Give Missourians better transportation choices



Appendix D - Stakeholder Outreach



Why a Freight Plan?

Building on *On the Move* and through **collaboration with freight partners**, we will **identify opportunities and actions** in the Freight Plan to **increase economic development and jobs**.



Focus Resources

- Project prioritization
- Business development
- Stark reality



Why reach out?

cost\$



Why reach out?

**What if more funds
become available?**



Appendix D - Stakeholder Outreach

Why reach out?

**Stakeholders know best
which projects and policies
can make businesses more
competitive**



What's in a Freight Plan?

- Existing data
- Inventory of freight strengths and weaknesses
- Freight goals and performance measures development
- Scenario planning
- Strategic policy improvements
- Project priorities

State Freight Plan



Appendix D - Stakeholder Outreach

Why is freight important?

- Freight volumes continue to grow



Why is freight important?

- Exports – global market competitiveness



Appendix D - Stakeholder Outreach

Why is freight important?

- Freight mobility is the economy in motion



Freight Movement

Economic Development

Jobs

FREIGHT
ON THE
Move

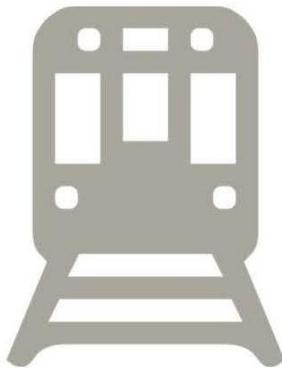
How does freight move in Missouri?



Crossroads of
the nation

FREIGHT
ON THE
Move

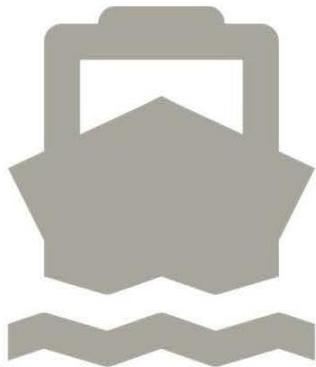
How does freight move in Missouri?



Top rail hubs
in nation



How does freight move in Missouri?

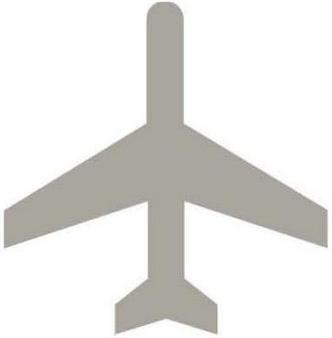


Missouri and
Mississippi
Rivers



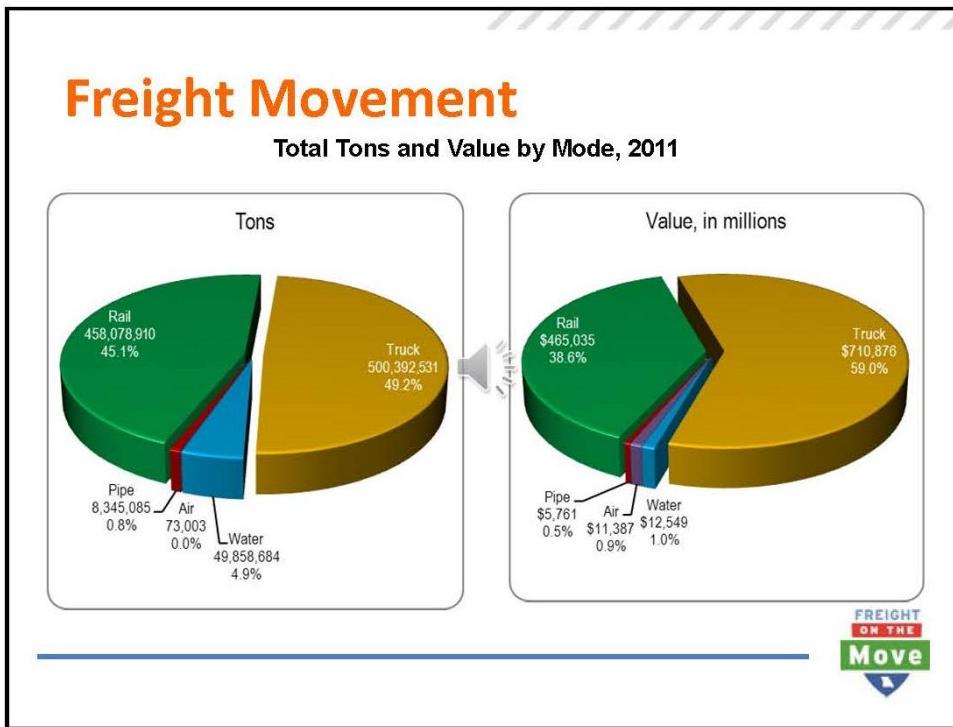
Appendix D - Stakeholder Outreach

How does freight move in Missouri?

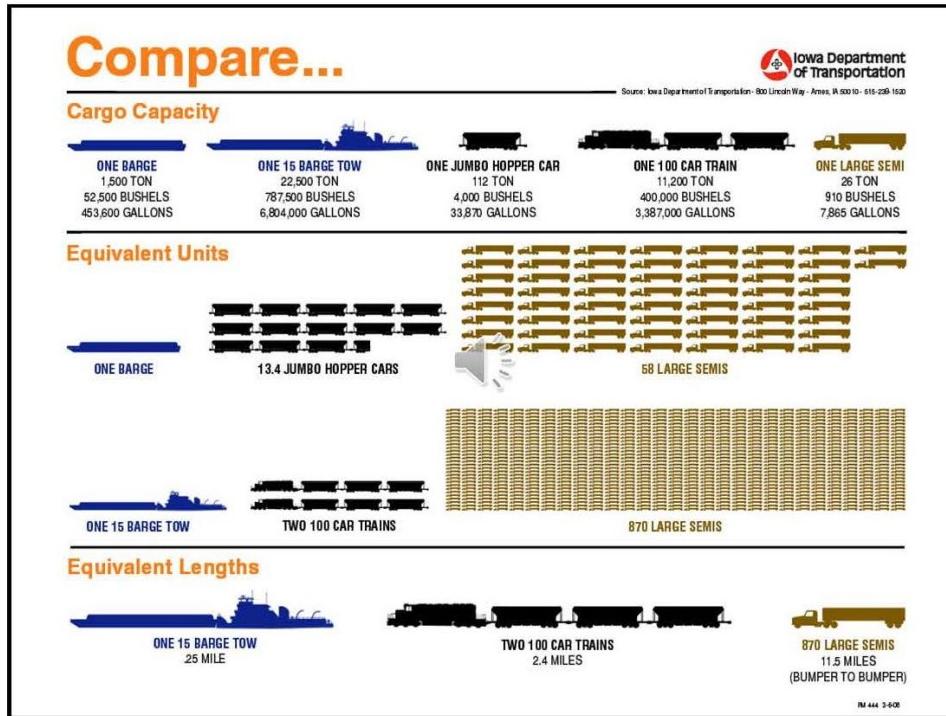


Two international airports in MO

FREIGHT ON THE Move



Appendix D - Stakeholder Outreach



Appendix D - Stakeholder Outreach

What have we heard across the state?



Generally, well-connected road network, but...



Connect all freight modes



Utilize waterways



Engage all private stakeholders



- Farm to market routes

- Dwindling rail

- Road capacity upgrades

- Access to economic development centers

- Water levels



Appendix D - Stakeholder Outreach



- Need highway improvements
- Railroad closings
- Mississippi River improvements





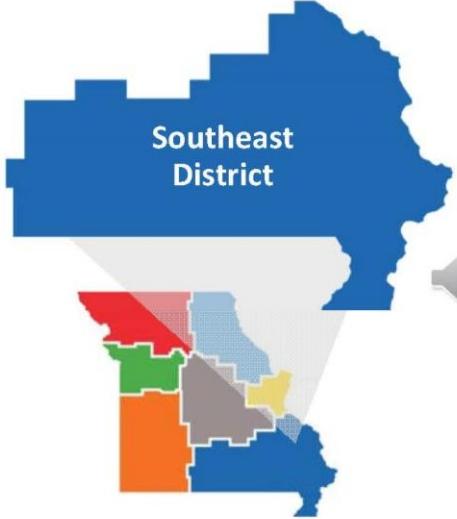


- Freight hub status
- I-70/I-44 congestion
- Last mile connections





Appendix D - Stakeholder Outreach



- Limited east/west connectivity
- US-67 completion
- Secondary highway upgrades
- Port funding







- Interstate upgrades
- Motor carrier accommodation and recruitment
- Flexible funding





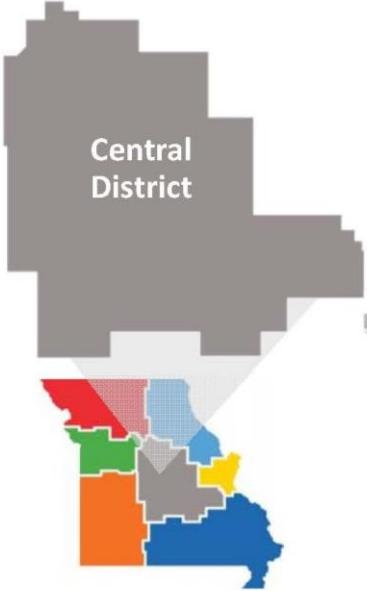
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- I-70 upgrades
- Private sector engagement
- E-commerce







- Improve north-south connectivity
- Missouri River potential
- Innovative funding
- Ag industry support





Appendix D - Stakeholder Outreach



Appendix D - Stakeholder Outreach

Keeping you involved

Please complete survey at

MoFreightPlan.org



Thank You!

For more information, contact:

Cheryl Ball
MoDOT Freight Administrator
cheryl.ball@modot.mo.gov
573-526-5578

Keith Bucklew
CDM Smith Project Manager
bucklewjk@cdmsmith.com
317-829-9629



Appendix D - Stakeholder Outreach



District Freight Forum Summaries

Appendix D - Stakeholder Outreach

ATTACHMENT 6: Central District Profile

A Vision for Freight in Missouri >>



As part of our On the Move initiative in 2013, MoDOT talked with thousands of Missourians in all 114 counties about our state's transportation future. We learned that Missourians want a transportation system that is well maintained, safe, grows our economy and leads to job creation, and provides Missourians with more interconnected travel options.

Freight moved by truck, train, barge and plane is an essential part of Missouri's economy and growth. Making smart investments in our freight transportation system can provide better options for Missouri businesses to get their products to market. An improved freight transportation system can also lower transportation costs and help create more jobs. Because freight is key to Missouri's vitality, MoDOT is developing a freight plan - with your help.

Freight Plan Goals >>

The plan will build on On the Move and alongside Missourians and our freight partners, we will identify opportunities and actions in the Freight Plan to increase economic development and jobs. The Freight Plan is a "deeper dive" into one of the critical areas identified through On the Move.

Trucks are expected to remain an important part of freight movement in Missouri, but more and more shipments are anticipated to use multiple modes of transportation. By connecting different modes of transportation, we can deliver products faster and more cost-effectively. And that's good for Missouri businesses and consumers alike.

The Freight Plan will help MoDOT meet the current and future needs of Missouri businesses. In November 2013, we began working on the plan. Our goal is to have a final Freight Plan ready by September 2014.



CENTRAL DISTRICT



Appendix D - Stakeholder Outreach

The Central District and Freight >>

MoDOT's Central District has 18 counties covering more than 11,000 square miles. Residents of Missouri's central region enjoy an excellent quality of life with the cost of living far below the national average, and good access to excellent hospitals, educational institutions and outdoor recreation. Columbia and Jefferson City are the largest cities in the district. Top area industries are financial, life sciences, agribusiness, warehousing/distribution and manufacturing. Major employers include ABB Power, Brewer Science, State Farm Insurance and Tracker Marine.

Freight moves by multiple transportation modes in the Central District. Major area roads include I-44 and I-70, as well as US-63, US-54, US-50, and US-40. Regional airports are located in Columbia and Fort Leonard Wood (Waynesville). Major rail access is provided by Kansas City Southern, Norfolk Southern, Burlington Northern Santa Fe and Union Pacific. The region also has a Missouri River port facility in Boonville.

What have we heard locally? >>

- Innovative funding options should continue to be explored. Stakeholders in this district are concerned that funding gaps are threatening programs that are working well, such as MoDOT's cost share program.
- Efforts should be made to improve connectivity throughout the district. Stakeholders identified a need for improving north-south connections and specifically noted concerns with US-63 between Jefferson City and Rolla. The district could also benefit from improvements to I-70, such as increased lanes, as the interstate is critical to moving freight and supporting the agriculture industry. Several stakeholders suggested that a multi-modal hub between Columbia and Jefferson City would support economic development in the district.
- The Missouri River is under-utilized and under-marketed. Stakeholders recognize that the district should expect increased demand over the next five years and beyond. Utilizing waterways will be critical in effectively moving additional freight and taking strain off of highways and rail lines.
- The freight system needs to support the agriculture industry, which is key to the economic success of the district and the State. As one stakeholder noted, "2014 ag industry technology is being moved on a 1940's (freight) network."

Appendix D - Stakeholder Outreach



What have we heard throughout the state? >>

MoDOT is strategically reaching out to key freight and industry stakeholders, such as logistics directors, shipping managers, and economic development professionals to discuss freight issues, needs, concerns, and opportunities in the state.

To date, MoDOT has received input from more than 180 key freight stakeholders through one-on-one interviews, district freight forums and surveys. Recurring themes from the state and each district are emerging and include:



CENTRAL DISTRICT

Missouri generally has a well-connected and functioning road network until there is a hiccup, such as congestion, weather or construction. Stakeholders also identified a need for capacity and maintenance improvements to maintain reliability of interstates and minor routes.

Missouri is a "crossroads for the continent" and has a vast freight network that is an asset for retaining existing businesses and attracting new business. Stakeholders voiced concern that not all modes are readily accessible and well connected with other modes (e.g. rail to water ports) and that work needs to be done to integrate the freight modal networks.

There is a need to engage additional stakeholders to help guide the freight plan. Previous efforts have lacked private sector engagement. Over the last several years MoDOT has collaborated with several private sectors groups on successful projects. This is an opportunity to build on those relationships, share information and continue to collaborate.

Investigate possibilities for utilizing waterways. Stakeholders see potential for growth on the Missouri and Mississippi Rivers but consistently brought up concerns including frequency of dredging, lack of improvements to the lock and dam system and inconsistent water levels. The expansion of the Panama Canal was also mentioned by stakeholders who want to make sure the state is positioned to take advantage of potentially increased freight flow and remain competitive. Stakeholders are concerned about low water levels and the impacts to operations if dredging frequency decreases.

Appropriately funding freight transportation projects is a key stakeholder concern. Stakeholders voiced a need to preserve the existing freight network and systems, but also said that improvements and enhancements are key to growing the state's economy.

Appendix D - Stakeholder Outreach

Every \$1 invested in transportation generates \$4 in economic activity.

"If we don't maintain access to our economic development hubs, we lose out on long-term growth."

Central District
2013 On the Move Listening Session Participant

Recent developments in Central Missouri increase reliance on freight networks

AUG
2013

Danuser Machine Company, Fulton to add 32,000 square feet of manufacturing space.

MAY
2013

Meramec Electrical Products announced plans to expand its manufacturing operations in Cuba, adding 47 new full-time jobs.

MAR
2013

3M announced plans to expand its specialty solar panel film production line at its Columbia plant over the next year, adding 50 jobs.

FEB
2013

Fluid Power Support, a steel fabrication company, will expand its operations in Mexico, making a capital investment of more than \$1.6 million and creating 15 new jobs.

JAN
2013

Brewer Science Inc., a company that produces materials for smartphones and tablet computers, plans to build a new manufacturing facility in rural central Missouri. The company expects to add 65 new jobs over the next 5 years as part of its expansion at the Rolla National Airport

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Let us know what you think.

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Appendix D - Stakeholder Outreach

ATTACHMENT 7: Kansas City District Profile

A Vision for Freight in Missouri >>



As part of our On the Move initiative in 2013, MoDOT talked with thousands of Missourians in all 114 counties about our state's transportation future. We learned that Missourians want a transportation system that is well maintained, safe, grows our economy and leads to job creation, and provides Missourians with more interconnected travel options.

Freight moved by truck, train, barge and plane is an essential part of Missouri's economy and growth. Making smart investments in our freight transportation system can provide better options for Missouri businesses to get their products to market. An improved freight transportation system can also lower transportation costs and help create more jobs. Because freight is key to Missouri's vitality, MoDOT is developing a freight plan - with your help.

Freight Plan Goals >>

The plan will build on On the Move and alongside Missourians and our freight partners, we will identify opportunities and actions in the Freight Plan to increase economic development and jobs. The Freight Plan is a "deeper dive" into one of the critical areas identified through On the Move.

Trucks are expected to remain an important part of freight movement in Missouri, but more and more shipments are anticipated to use multiple modes of transportation. By connecting different modes of transportation, we can deliver products faster and more cost-effectively. And that's good for Missouri businesses and consumers alike.

The Freight Plan will help MoDOT meet the current and future needs of Missouri businesses. In November 2013, we began working on the plan. Our goal is to have a final Freight Plan ready by September 2014.



KANSAS CITY DISTRICT



Appendix D - Stakeholder Outreach

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2013 On the Move Listening Session Participant

Recent developments in the Kansas City District increase reliance on freight networks

DEC
2013

Aspen Contracting, a Lee's Summit firm announced plans to add 300 jobs in its sales, production and project management operations.

Aviation Technical Services, is opening a 607,000 square foot facility in Kansas City, expected to create more than 500 new jobs over the next 3 to 5 years, with potential for 1,000 employees over time.

NOV
2013

Grupo Antolin North America, announced plans to invest more than \$15.7 million in a manufacturing facility to supply Ford's Kansas City Assembly Plant, creating an estimated 118 new jobs.

SEP
2013

BIME Analytics, opened its new North American headquarters in Kansas City's Crossroads District and is expected to hire 44 new employees within the next five years.

LightEdge Solutions, will open a new regional office in Kansas City making a \$58,357,912 capital investment and creating 21 new jobs.

AUG
2013

Cerner Corp. announced that it is moving forward with plans to extend its Missouri campus and bring between 12,000 and 15,000 jobs to Kansas City.

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Appendix D - Stakeholder Outreach

The Kansas City District and Freight >>

MoDOT's Kansas City District has nine counties covering more than 5,650 square miles. Residents of Missouri's Kansas City region enjoy an excellent quality of life with the cost of living far below the national average, and good access to excellent hospitals, educational institutions, cultural amenities and outdoor recreation. Kansas City, Independence and Lee's Summit are the largest cities in the district. Growing industries include advanced energy, biosciences, data centers, engineering, and manufacturing. Many major companies are headquartered in the KC region including Cerner Corporation, Hallmark and H&R Block.

Freight moves by multiple transportation modes in the Kansas City District. Major area roads include I-29, I-35, I-49, I-70, I-435, I-470, I-635 and I-670 as well as US-24, US-40, US-50, US-56, US-65, US-69 and US-169. Kansas City International Airport is the area's largest airport and one of only two major commercial airports in the state. Major rail access is provided by Burlington Northern Santa Fe, Central Midland, Canadian Pacific, Kansas City Southern, Kaw River, Missouri & Northern Arkansas, Norfolk Southern and Union Pacific. Kansas City is the largest rail hub in the nation in terms of tonnage. The region also has a Missouri River port in Kansas City.

What have we heard locally? >>

-  The Kansas City community is proud of its status as one of the largest rail freight and trucking hubs in the country. Stakeholders commented that integrating different freight modes is important regionally and nationally. Assets in this district include a rapidly growing Foreign Trade Zone and the BNSF multi-modal facility located across the state line in Kansas, which will have the largest speculative space in the country.
-  Capacity upgrades to I-70 are a top priority in the Kansas City District as well as across the State. The importance of the I-70 corridor to freight movement is echoed throughout all of the districts. Additional lanes were suggested to provide better reliability along the corridor. Other top priority corridors identified included I-49 and the south leg of I-435.
-  Private sector engagement is a crucial part of crafting a meaningful freight plan. Stakeholders suggest that key businesses, including railroads, should be brought into crafting the plan and that the best way to do that is through cultivating relationships and building trust. In addition, information on private sector freight movements that has not been available in the past is needed for a complete freight picture and a plan that enhances economic development in the State.
-  The increase in the use of e-commerce is changing the way that freight stakeholders conduct business and will require a freight system that accommodates that shift. Stakeholders pointed out that more distribution centers will lead to greater pressure on roadways.

Appendix D - Stakeholder Outreach



What have we heard throughout the state? >>

MoDOT is strategically reaching out to key freight and industry stakeholders, such as logistics directors, shipping managers, and economic development professionals to discuss freight issues, needs, concerns, and opportunities in the state.

To date, MoDOT has received input from more than 180 key freight stakeholders through one-on-one interviews, district freight forums and surveys. Recurring themes from the state and each district are emerging and include:



Missouri generally has a well-connected and functioning road network until there is a hiccup, such as congestion, weather or construction. Stakeholders also identified a need for capacity and maintenance improvements to maintain reliability of interstate and minor routes.

Missouri is a "crossroads for the continent" and has a vast freight network that is an asset for retaining existing businesses and attracting new business. Stakeholders voiced concern that not all modes are readily accessible and well connected with other modes (e.g. rail to water ports) and that work needs to be done to integrate the freight modal networks.

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Investigate possibilities for utilizing waterways. Stakeholders see potential for growth on the Missouri and Mississippi Rivers but consistently brought up concerns including frequency of dredging, lack of improvements to the lock and dam system and inconsistent water levels. The expansion of the Panama Canal was also mentioned by stakeholders who want to make sure the state is positioned to take advantage of potentially increased freight flow and remain competitive. Stakeholders are concerned about low water levels and the impacts to operations if dredging frequency decreases.

Appropriately funding freight transportation projects is a key stakeholder concern. Stakeholders voiced a need to preserve the existing freight network and systems, but also said that improvements and enhancements are key to growing the state's economy.

Appendix D - Stakeholder Outreach

ATTACHMENT 8: Northeast District Profile

A Vision for Freight in Missouri >>



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NORTHEAST DISTRICT



Appendix D - Stakeholder Outreach

The Northeast District and Freight >>

MoDOT's Northeast District has 17 counties covering more than 9,000 square miles. Residents of Missouri's northeast region enjoy an excellent quality of life with the cost of living far below the national average, and good access to excellent hospitals, educational institutions and outdoor recreation. Hannibal, Kirksville, Moberly, Mexico, Troy and Warrenton are the largest cities in the district. Top industries include agribusiness, food processing, and manufacturing. Major employers include ConAgra, General Mills, Kraft and Tyson.

Freight moves by multiple transportation modes in the Northeast District. Major area roads include I-70 and I-72 as well as US-24, US-36, US-54, US-61, US-63 and US-136. A regional airport is located in Kirksville. Major rail access is provided by Burlington Northern Santa Fe, Norfolk Southern, Kansas City Southern and Union Pacific. The region also has a Mississippi River port facility at Lewis County.

What have we heard locally? >>

-  Capacity expansion and maintenance of highway networks are essential to ensuring network reliability. Specific examples of maintenance issues provided by stakeholders included US-36 from Shelbina to Hunnewell and Monroe City and along US-61 between Palmyra and Hannibal. Road surfaces in many sections are "rougher than a cob." Capacity issues include too much truck traffic on I-70, and bottlenecking on US-61 in Hannibal and on the I-70 interchange in Warrenton.
-  Future growth is threatened by railroads closing local crossings and spurs and removing scales in this district.
-  Locks and dams along the Mississippi River need improvement. Port stakeholders in this region mentioned the deteriorating condition of the lock and dam system as a challenge for Missouri freight in the future.

Appendix D - Stakeholder Outreach

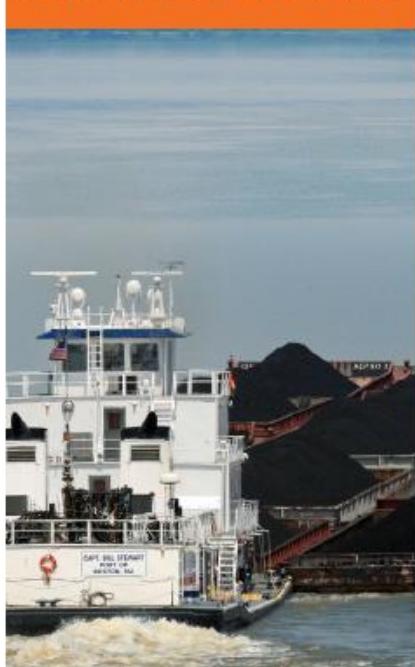


What have we heard throughout the state? >>

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NORTHEAST DISTRICT



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Appendix D - Stakeholder Outreach

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2013 On the Move Listening Session Participant

Recent developments in Northeast Missouri increase reliance on freight networks

JUN
2013

Bodine Aluminum, a wholly-owned subsidiary of Toyota Motor Corp. and a manufacturer of casting parts, will invest \$50 million and create 40 new jobs at its plant in Troy, Mo.

Hartzell Hardwoods announced an expansion of operations less than a year after opening its doors in Kirksville, adding more than a dozen new employees. Hartzell recently added 15 employees to support expanded operations, all of which was enabled by a 35,000-square-foot warehouse addition and 22,000 square feet of buildings constructed to dry hardwood lumber and store materials.

Calumet Specialty Products Partners, a leading specialty hydrocarbon producer, is planning a significant expansion of their esters production facility in Louisiana. Expansion plans include up to \$40 million in capital investment and an expected creation of 21 new jobs.

APR
2013

CertainTeed, a leading North American corporation that manufactures materials for commercial and residential builders, announced plans to build a new Midwest production and distribution center in Jonesburg making a capital investment of \$100 million in an expansion that is expected to create 100 new local jobs.



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Appendix D - Stakeholder Outreach

ATTACHMENT 9: Northwest District Profile

A Vision for Freight in Missouri >>



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Freight Plan Goals >>

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Appendix D - Stakeholder Outreach

The Northwest District and Freight >>

MoDOT's Northwest District has 20 counties covering more than 10,770 square miles. Residents of Missouri's northwest region enjoy an excellent quality of life with the cost of living far below the national average, and good access to excellent hospitals, educational institutions and outdoor recreation. St. Joseph, Chillicothe and Maryville are the largest cities in the district. Top industries in the region include agribusiness, animal health, and manufacturing, with major companies such as Farmland Foods, Boehringer Ingelheim Vetmedica, and Kawasaki Motors all choosing to locate their operations in the area.

Freight moves by multiple transportation modes in the Northwest District. Major area roads include I-29, I-229 and I-35 as well as US-24, US-36, US-59, US-65, US-69, US-71, US-136, US-159, US-169 and US-275. Regional airports are located in Cameron, Chillicothe, Maryville, St. Joseph and Trenton. Major rail access is provided by Burlington Northern Santa Fe, Canadian Pacific Railway, Missouri North Central, Norfolk Southern and Union Pacific. The region also has a Missouri River port facility in St. Joseph.

What have we heard locally? >>

-  Farm-to-market routes are essential to the region's economy. Rail access in this region is decreasing, so lettered routes are very important, not only for moving agriculture goods, but also as connections for manufacturers to highways and interstates.
-  Road capacity upgrades are important in the region. Despite I-70 passing outside of the district to the south, stakeholders indicated that it should be improved to a six-lane facility. Stakeholders also suggested increasing capacity to four lanes between I-29 and I-35 through Maryville. US-36 is an important corridor for business owners and should be considered for interstate designation. One private truck freight fleet operator called US-36 a "national best-kept secret." He explained that it is a safer route and that it saves his drivers an hour in drive time to Indianapolis.
-  There is a dwindling rail presence in the district. Stakeholders pointed out that there were more freight rail options in the past and many of those options no longer exist in the district.
-  Economic development efforts, such as the Eastowne Business Park in St. Joseph, need adequate roadway access. In addition, food industry businesses, such as Farmland Foods, could benefit from investment in intermodal access.
-  Low water levels and water quality in the district port and throughout the State concern stakeholders, as does local funding for the port.

Appendix D - Stakeholder Outreach



MoDOT is strategically reaching out to key freight and industry stakeholders, such as logistics directors, shipping managers, and economic development professionals to discuss freight issues, needs, concerns, and opportunities in the state.

To date, MoDOT has received input from more than 180 key freight stakeholders through one-on-one interviews, district freight forums and surveys. Recurring themes from the state and each district are emerging and include:

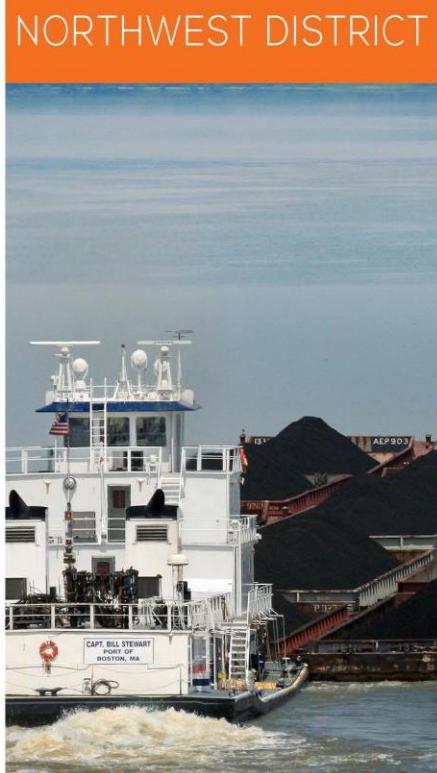
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Appendix D - Stakeholder Outreach

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2013 On the Move Listening Session Participant

Recent developments in Northwest Missouri increase reliance on freight networks

OCT
2013

PAC Customer Services, an Illinois-based company, announced plans to expand into the St. Joseph market, adding 345 new jobs to a local call center.

System and Services Technology, Inc. (SST) will add 345 new jobs at its St. Joseph service center. **USA 800** will add at least 250 full-time employees to its staff in St. Joseph.

AUG
2013

IBC North America and Clean Tide Container announced plans to co-open a new facility in Chillicothe to manufacture and refurbish intermediate bulk containers, investing more than \$5.1 million and creating 87 new local jobs.

MAY
2013

Triumph Foods, LLC, will be expanding its facility in St. Joseph. The expansion includes approximately a \$7.5 million capital investment and is expected to create 105 new full-time jobs within one year.

FedEx announced plans to build a \$3.9 million distribution center in St. Joseph.

FEB
2013

I&M Machine & Fabrication Corporation announced plans to expand in St. Joseph, making a capital investment of \$1.6 million and creating 25 new jobs.

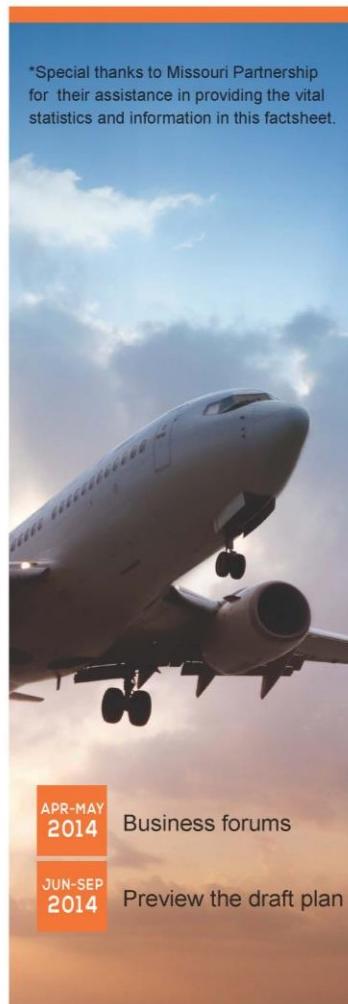


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Appendix D - Stakeholder Outreach

ATTACHMENT 10: St. Louis District Profile

A Vision for Freight in Missouri >>



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Appendix D - Stakeholder Outreach

The St. Louis District and Freight >>

MoDOT's St. Louis District has four counties and the City of St. Louis. Residents of Missouri's St. Louis region enjoy an excellent quality of life with the cost of living far below the national average, and good access to excellent hospitals, educational institutions, cultural amenities and outdoor recreation. St. Louis, O'Fallon, St. Charles and St. Peters are the largest cities in the district. Leading industries include plant and medical sciences, advanced manufacturing, information technology, financial services, transportation and distribution. Nine Fortune 500 firms are headquartered in the region.

Freight moves by multiple transportation modes in the St. Louis District. Major area roads include I-44, I-55, I-64 and I-70, I-170, I-255 and I-270 as well as US-40, US-50, US-61 and US-67. Lambert-St. Louis International Airport is the area's largest airport and one of only two major commercial airports in the state. Major rail access is provided by Burlington Northern Santa Fe, Canadian National, CSX, Norfolk Southern and Union Pacific. St. Louis is the third largest rail hub in the nation. The Port of St. Louis is the busiest inland port in the United States. In addition to St. Louis, there is an active port in Jefferson County.



What have we heard locally? >>

- St. Louis is challenged to compete as a freight hub, and focus should be placed on developing opportunities for intermodal activities and international export. Stakeholders said transforming St. Louis to a major freight hub status is needed to grow the regional economy. While "St. Louis tends to be a pass-through," there are opportunities to develop additional facilities, particularly as an alternate freight hub to Chicago, which is highly congested. Stakeholders would like the public to be better informed on how freight transportation infrastructure supports the economy and jobs.
- Congestion on I-70 and I-44 causes costly delays and some safety concerns.
- It is difficult to move freight from ports and airports directly to destinations. Better connectivity is needed between the freight modes. Stakeholders are concerned about the difficulty businesses have in making the "last-mile connections." This issue was recently raised when trying to attract large economic development deals to the region.
- Air cargo facilities are available at Lambert Airport, but they are dated and small.
- Deficient bridges in the district could cause costly delays and pose safety concerns for carriers.
- There is a shortage of available motor carriers and truck fleets as it is becoming increasingly difficult to recruit and insure drivers, and many fleets have left St. Louis. These shortages are driving up costs to move freight on roadways.

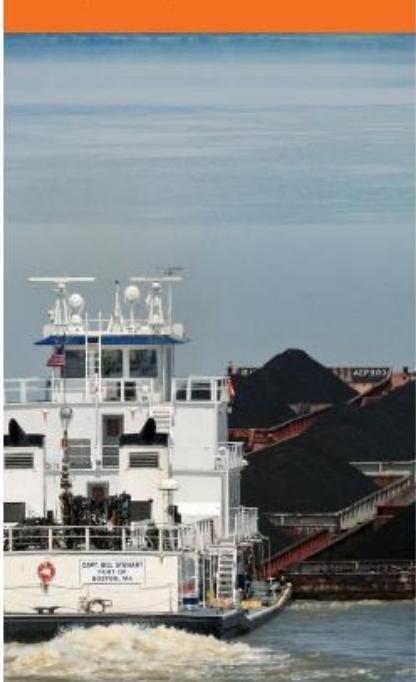
Appendix D - Stakeholder Outreach

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ST. LOUIS DISTRICT



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2013 On the Move Listening Session Participant

Recent developments in the St. Louis District increase reliance on freight networks

**DEC
2013**

Boeing announced plans to add up to 400 additional research and technology jobs at its St. Louis County campus. This is the second major St. Louis jobs announcement this year.

Client Services Incorporated (CSI), a call center with clients in the financial services, healthcare, customer care, and utilities industries, announced plans to add 300 full-time account representatives and 100+ part-time positions over the next 6 months.

**NOV
2013**

Cofactor Genomics opened a new \$3.8 million headquarters and laboratory facility in St. Louis. As part of this expansion, the company plans to hire 24 new employees, tripling its current employment.

IKEA announced plans to build a 380,000 square foot store in midtown St. Louis. The project is expected to bring about 500 construction jobs, and IKEA says it will hire 300 full-time workers.

**OCT
2013**

Clayton-based Enterprise Holdings, the nation's largest rental car company, announced plans to hire 11,000 new full-time workers by mid 2014, including about 500 in St. Louis.



Let us know what you think.

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Preview the draft plan

Appendix D - Stakeholder Outreach

ATTACHMENT 11: Southeast District Profile

A Vision for Freight in Missouri >>



As part of our On the Move initiative in 2013, MoDOT talked with thousands of Missourians in all 114 counties about our state's transportation future. We learned that Missourians want a transportation system that is well maintained, safe, grows our economy and leads to job creation, and provides Missourians with more interconnected travel options.

Freight moved by truck, train, barge and plane is an essential part of Missouri's economy and growth. Making smart investments in our freight transportation system can provide better options for Missouri businesses to get their products to market. An improved freight transportation system can also lower transportation costs and help create more jobs. Because freight is key to Missouri's vitality, MoDOT is developing a freight plan - with your help.

Freight Plan Goals >>

The plan will build on On the Move and alongside Missourians and our freight partners, we will identify opportunities and actions in the Freight Plan to increase economic development and jobs. The Freight Plan is a "deeper dive" into one of the critical areas identified through On the Move.

Trucks are expected to remain an important part of freight movement in Missouri, but more and more shipments are anticipated to use multiple modes of transportation. By connecting different modes of transportation, we can deliver products faster and more cost-effectively. And that's good for Missouri businesses and consumers alike.

The Freight Plan will help MoDOT meet the current and future needs of Missouri businesses. In November 2013, we began working on the plan. Our goal is to have a final Freight Plan ready by September 2014.



SOUTHEAST DISTRICT



Appendix D - Stakeholder Outreach

The Southeast District and Freight >>

MoDOT's Southeast District has 25 counties covering more than 16,000 square miles. Residents of Missouri's southeast region enjoy an excellent quality of life with the cost of living far below the national average, and good access to excellent hospitals, educational institutions and outdoor recreation. Cape Girardeau, Poplar Bluff and Sikeston are the largest cities in the district. Top industries include agribusiness, manufacturing, life sciences and transportation/logistics. Major employers include Procter & Gamble and Tyson.

Freight moves by multiple transportation modes in the Southeast District. Major area roads include I-55, I-57 and I-155 as well as US-60, US-61, US-62, US-63, US-67, US-160 and US-412. Regional airports are located in Cape Girardeau, New Madrid and Sikeston. Major rail access is provided by Burlington Northern Santa Fe and Union Pacific. The region also has Mississippi River port facilities at SEMO Port in Scott City, Mississippi County, New Madrid County, Pemiscot County and Ste. Genevieve County.

What have we heard locally? >>

- East-west connectivity is limited regionally and a St. Louis bypass could help congestion. Capacity concerns in the St. Louis area led many stakeholders to suggest an east-west or diagonal corridor to provide "this area a direct route through central Missouri" as an alternative to the longer I-55/I-70 route. Another interviewee said Missouri "needs an 'X' through the middle of the state to connect southeast Missouri with Kansas City and Kirksville to Joplin and Springfield." Stakeholders also suggested a freeway-type roadway (i.e. four-laning US-60 across the state).
- US-67 is a key north-south connection, and completing the route through Arkansas would increase economic opportunities.
- Industry relies on secondary highways for time-sensitive delivery and connections to interstates, and the condition of these roadways could be improved. Several stakeholders suggested resurfacing and capacity upgrades.
- Stakeholders are concerned about funding for ports and waters for small-level capital projects. Additionally, several stakeholders commented about the need for consistent support of dredging.

Appendix D - Stakeholder Outreach



What have we heard throughout the state? >>

MoDOT is strategically reaching out to key freight and industry stakeholders, such as logistics directors, shipping managers, and economic development professionals to discuss freight issues, needs, concerns, and opportunities in the state.

To date, MoDOT has received input from more than 180 key freight stakeholders through one-on-one interviews, district freight forums and surveys. Recurring themes from the state and each district are emerging and include:

Missouri generally has a well-connected and functioning road network until there is a hiccup, such as congestion, weather or construction. Stakeholders also identified a need for capacity and maintenance improvements to maintain reliability of interstates and minor routes.

Missouri is a "crossroads for the continent" and has a vast freight network that is an asset for retaining existing businesses and attracting new business. Stakeholders voiced concern that not all modes are readily accessible and well connected with other modes (e.g. rail to water ports) and that work needs to be done to integrate the freight modal networks.

There is a need to engage additional stakeholders to help guide the freight plan. Previous efforts have lacked private sector engagement. Over the last several years MoDOT has collaborated with several private sectors groups on successful projects. This is an opportunity to build on those relationships, share information and continue to collaborate.

Investigate possibilities for utilizing waterways. Stakeholders see potential for growth on the Missouri and Mississippi Rivers but consistently brought up concerns including frequency of dredging, lack of improvements to the lock and dam system and inconsistent water levels. The expansion of the Panama Canal was also mentioned by stakeholders who want to make sure the state is positioned to take advantage of potentially increased freight flow and remain competitive. Stakeholders are concerned about low water levels and the impacts to operations if dredging frequency decreases.

Appropriately funding freight transportation projects is a key stakeholder concern. Stakeholders voiced a need to preserve the existing freight network and systems, but also said that improvements and enhancements are key to growing the state's economy.



Appendix D - Stakeholder Outreach

Every \$1 invested in transportation generates \$4 in economic activity.

"If we don't maintain access to our economic development hubs, we lose out on long-term growth."

2013 On the Move Listening Session Participant

Recent developments in Southeast Missouri increase reliance on freight networks

JUL
2013

Noranda Aluminum Holding Corporation, a leading North American producer of aluminum, announced plans to significantly expand the footprint of its smelter in New Madrid. The facility expansion includes a \$45 million capital investment and is expected to create 29 new jobs.

APR
2013

Marquis Missouri Terminal, LLC announces it will double the throughput capacity and construct an additional barge dock in the Pemiscot County Port Authority slip.

JAN
2013

AT&T, announced it would hire more than 30 new full-time employees at its Cape Girardeau call center.

MAR
2012

TG Missouri, an auto supply plant in Perryville, announced a \$39-million expansion, which will result in 200 new jobs over the next 5 years.

*Special thanks to Missouri Partnership for their assistance in providing the vital statistics and information in this factsheet.



Let us know what you think.



www.MoFreightPlan.org

APR-MAY
2014

Business forums

JUN-SEP
2014

Preview the draft plan

Appendix D - Stakeholder Outreach

ATTACHMENT 12: Southwest District Profile

A Vision for Freight in Missouri >>

As part of our On the Move initiative in 2013, MoDOT talked with thousands of Missourians in all 114 counties about our state's transportation future. We learned that Missourians want a transportation system that is well maintained, safe, grows our economy and leads to job creation, and provides Missourians with more interconnected travel options.

Freight moved by truck, train, barge and plane is an essential part of Missouri's economy and growth. Making smart investments in our freight transportation system can provide better options for Missouri businesses to get their products to market. An improved freight transportation system can also lower transportation costs and help create more jobs. Because freight is key to Missouri's vitality, MoDOT is developing a freight plan - with your help.

Freight Plan Goals >>

The plan will build on On the Move and alongside Missourians and our freight partners, we will identify opportunities and actions in the Freight Plan to increase economic development and jobs. The Freight Plan is a "deeper dive" into one of the critical areas identified through On the Move.

Trucks are expected to remain an important part of freight movement in Missouri, but more and more shipments are anticipated to use multiple modes of transportation. By connecting different modes of transportation, we can deliver products faster and more cost-effectively. And that's good for Missouri businesses and consumers alike.

The Freight Plan will help MoDOT meet the current and future needs of Missouri businesses. In November 2013, we began working on the plan. Our goal is to have a final Freight Plan ready by September 2014.



SOUTHWEST DISTRICT



Appendix D - Stakeholder Outreach

The Southwest District and Freight >>

MoDOT's Southwest District has 21 counties covering more than 13,000 square miles. Residents of Missouri's southwest region enjoy an excellent quality of life with the cost of living far below the national average, and good access to excellent hospitals, educational institutions and outdoor recreation. The region's immediate proximity to major freight operations in Northwest Arkansas presents a unique dynamic for the area. Springfield and Joplin are the largest cities in the district. Top area industries include transportation/logistics, information technology, manufacturing and warehousing/distribution. Major employers include 3M, Bass Pro Shops, La-Z-Boy, General Mills, and Jack Henry & Associates and O'Reilly Automotive.

Freight moves by multiple transportation modes in the Southwest District. Major area roads include I-44 and I-49 as well as US-54, US-60, US-65, US-71, US-160 and US-166. Regional airports include Clinton Memorial Airport, Joplin Regional Airport, Springfield-Branson National Airport. Major rail access is provided by Arkansas & Missouri, Burlington Northern Santa Fe, Kansas City Southern and Missouri & Northern Arkansas.

What have we heard locally? >>

- Interstate capacity upgrades are needed. Many stakeholders suggested adding lanes to I-70 and I-44. "I-44 is aging out and will need additional capacity as the population increases in the region." Congestion on these interstate corridors is a top concern for many, especially in urban areas. One stakeholder recommended completing I-49 to the Arkansas state line.
- Motor carrier accommodation and recruitment is a high priority in this district. A recurring theme from stakeholders is the need for better accommodations for motor carriers, such as improved and larger rest areas. In addition, stakeholders are interested in motor carrier recruitment, driver training programs for the general public to increase safety on roadways, and less regulation on drivers.
- Funding programs for freight should be flexible so each district can target their specific needs, regardless of mode.

Appendix D - Stakeholder Outreach



What have we heard throughout the state? >>

MoDOT is strategically reaching out to key freight and industry stakeholders, such as logistics directors, shipping managers, and economic development professionals to discuss freight issues, needs, concerns, and opportunities in the state.

To date, MoDOT has received input from more than 180 key freight stakeholders through one-on-one interviews, district freight forums and surveys. Recurring themes from the state and each district are emerging and include:



Missouri generally has a well-connected and functioning road network until there is a hiccup, such as congestion, weather or construction. Stakeholders also identified a need for capacity and maintenance improvements to maintain reliability of interstates and minor routes.

Missouri is a "crossroads for the continent" and has a vast freight network that is an asset for retaining existing businesses and attracting new business. Stakeholders voiced concern that not all modes are readily accessible and well connected with other modes (e.g. rail to water ports) and that work needs to be done to integrate the freight modal networks.

There is a need to engage additional stakeholders to help guide the freight plan. Previous efforts have lacked private sector engagement. Over the last several years MoDOT has collaborated with several private sectors groups on successful projects. This is an opportunity to build on those relationships, share information and continue to collaborate.

Investigate possibilities for utilizing waterways. Stakeholders see potential for growth on the Missouri and Mississippi Rivers but consistently brought up concerns including frequency of dredging, lack of improvements to the lock and dam system and inconsistent water levels. The expansion of the Panama Canal was also mentioned by stakeholders who want to make sure the state is positioned to take advantage of potentially increased freight flow and remain competitive. Stakeholders are concerned about low water levels and the impacts to operations if dredging frequency decreases.

Appropriately funding freight transportation projects is a key stakeholder concern. Stakeholders voiced a need to preserve the existing freight network and systems, but also said that improvements and enhancements are key to growing the state's economy.

Appendix D - Stakeholder Outreach

Every \$1 invested in transportation generates \$4 in economic activity.

"If we don't maintain access to our economic development hubs, we lose out on long-term growth."

2013 On the Move Listening Session Participant

Recent developments in Southwest Missouri increase reliance on freight networks

**DEC
2013**

Watson Metal Masters announced plans to invest \$4.8 million in new manufacturing facility in Republic, expected to create 77 new jobs.

Stainless Technology, a manufacturer of stainless steel tanks, announced plans to expand its Springfield operations. The company plans to hire up to 88 new employees, more than doubling the current workforce at the facility.

**OCT
2013**

AT&T announced plans to add 65 new positions at their Joplin call center.

**SEP
2013**

TSI, will add three engineers in Springfield, bringing the company total to 145 employees.

**AUG
2013**

Leggett & Platt announced a \$5.1 million expansion of their Carthage Flex-O-Lators facility, which manufactures automotive seating components, adding 28,000 square feet and an expected 12 jobs.

**JUL
2013**

Aegis Limited announced plans to hire 300 people for its Joplin call center over the next 4 months.

*Special thanks to Missouri Partnership for their assistance in providing the vital statistics and information in this factsheet.



Let us know what you think.

www.MoFreightPlan.org

**APR-MAY
2014**

Business forums

**JUN-SEP
2014**

Preview the draft plan

Priorities and Investment Forum Presentation

ATTACHMENT 13: Statewide Presentation

Appendix D - Stakeholder Outreach



Priorities & Investments Freight Webinar

MoDOT Statewide Freight Plan
May 13, 2014



Today's Focus



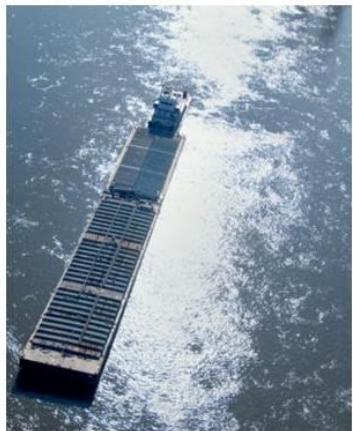
How can MoDOT best prioritize freight investments?



What types of projects are most important in this area?



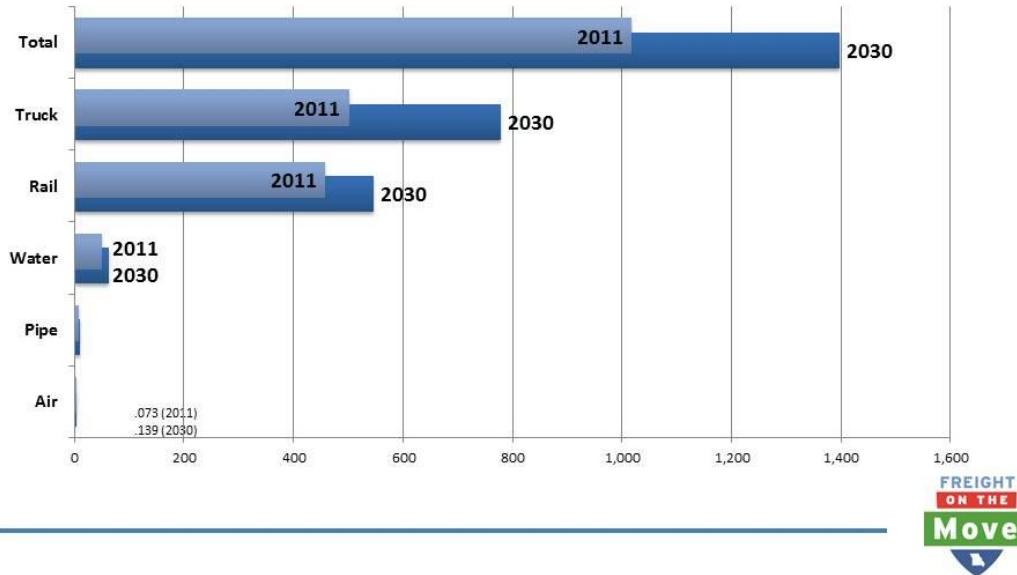
Trends & Needs



Appendix D - Stakeholder Outreach

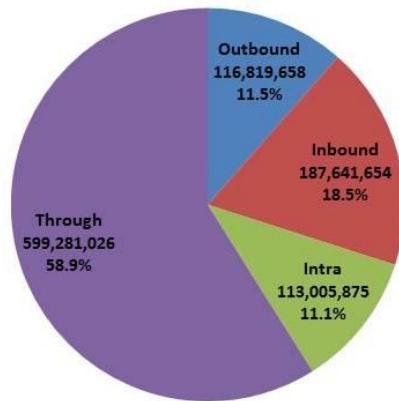
Freight Growth

Tonnage Forecast (Millions) by Mode, 2011 to 2030



Freight Movements

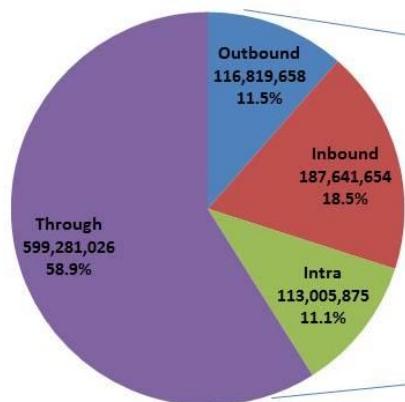
Tonnage by Direction, 2011



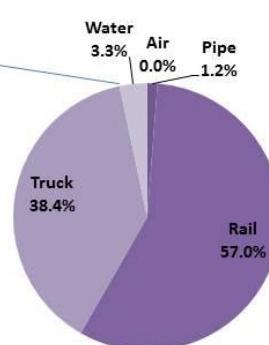
Appendix D - Stakeholder Outreach

Freight Movements

Tonnage by Direction, 2011



Through Movement by Mode

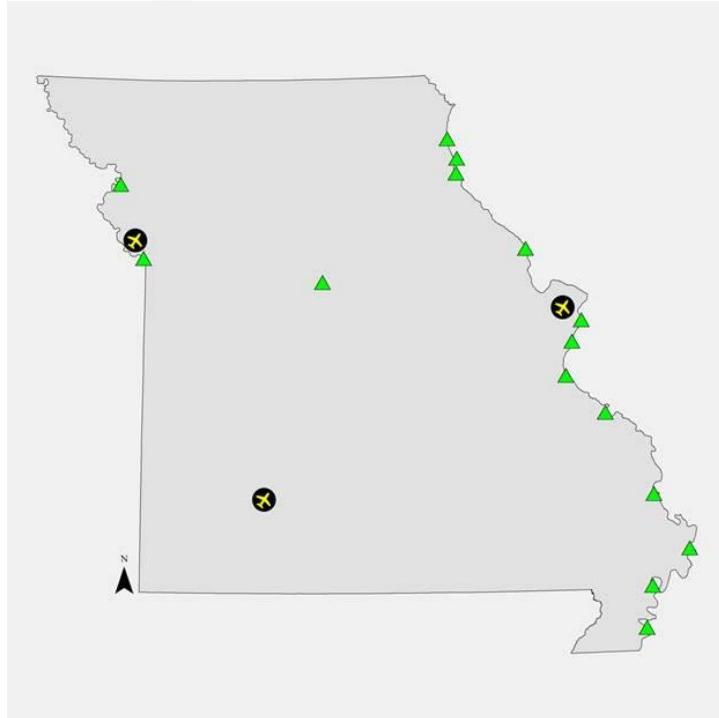


Freight Network-Airport

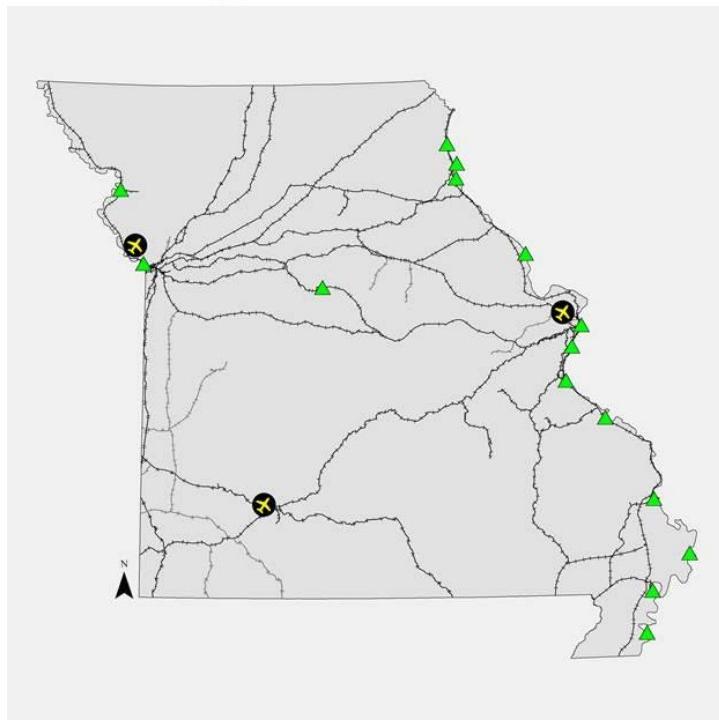


Appendix D - Stakeholder Outreach

Freight Network-Ports

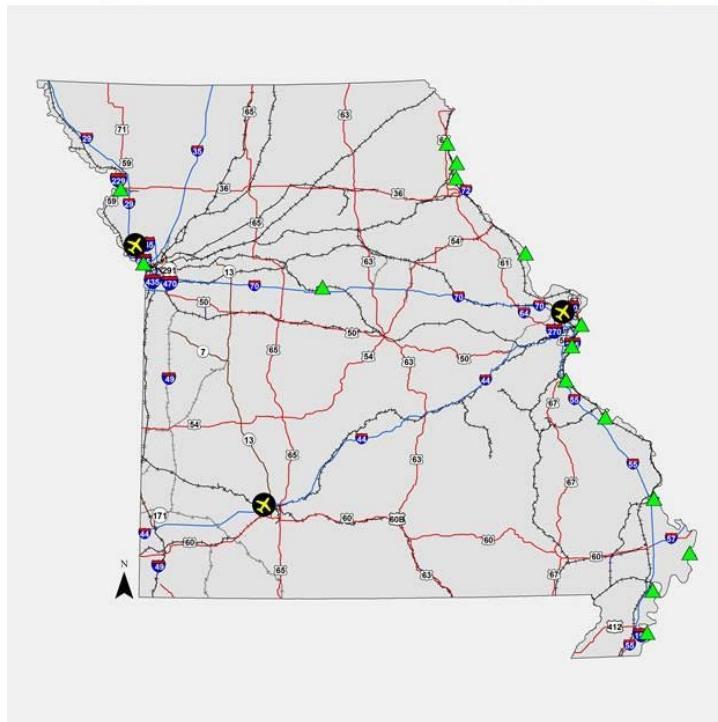


Freight Network-Rail

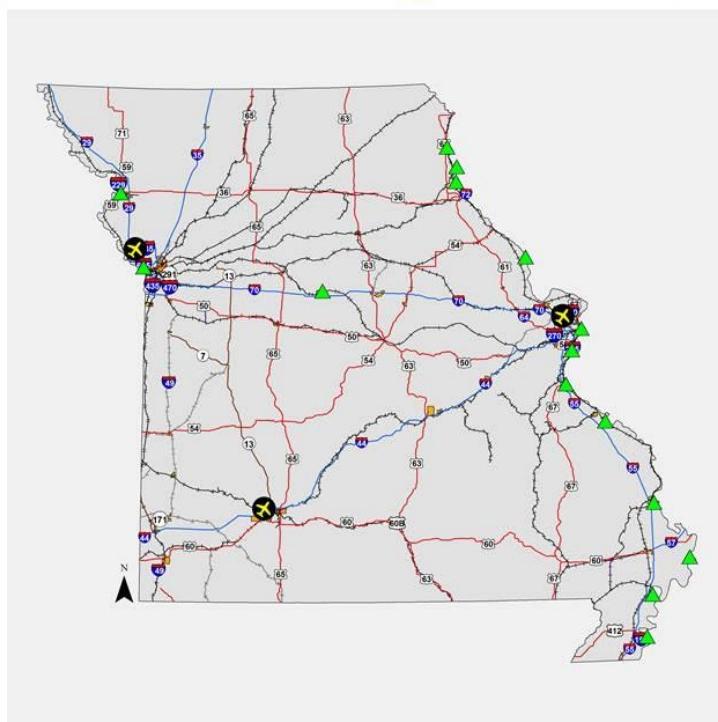


Appendix D - Stakeholder Outreach

Freight Network-Highways

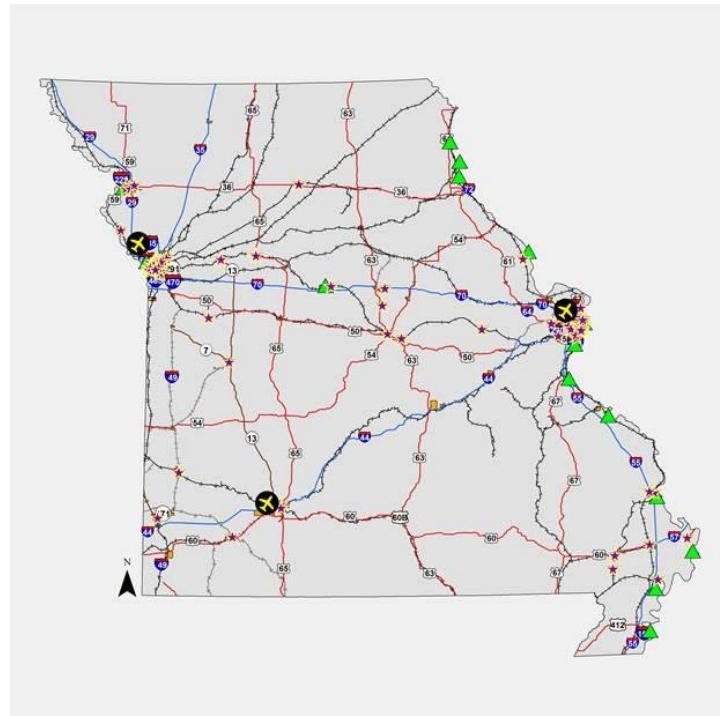


Freight Network-Freight Generators

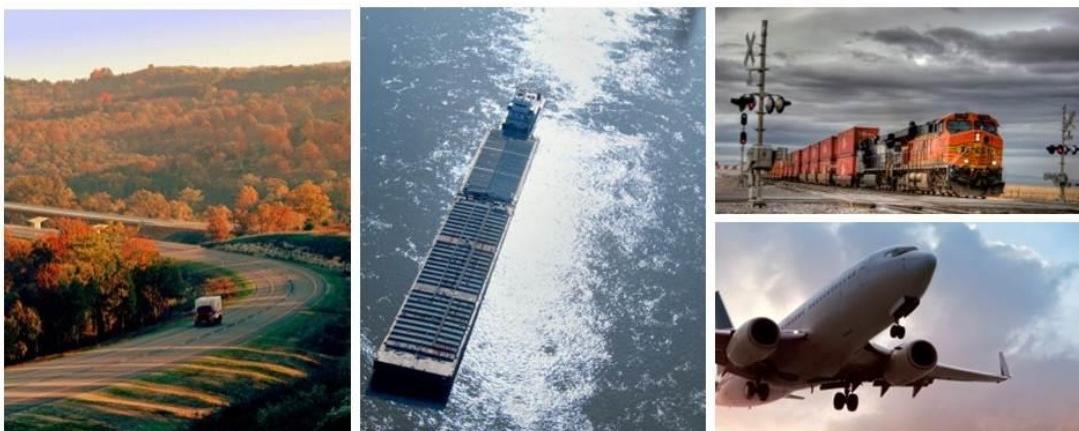


Appendix D - Stakeholder Outreach

Freight Network-Intermodal Facilities



Prioritization Framework



Why reach out?

cost\$

Why reach out?



**What if more funds
become available?**

Why reach out?

**Stakeholders know best
which projects and policies
can make businesses more
competitive**

Purpose of the Freight Plan

Building on *On the Move* and through
collaboration with freight partners,
we will **identify opportunities and
actions** in the Freight Plan to **increase
economic development and jobs.**



Project Prioritization Framework

Purpose is to help decision makers evaluate **future freight network investments** to meet freight goals.

Filters reflect **goals and measures** developed through robust stakeholder involvement.



Freight Goals Align with Long Range Plan Goals

Long Range Plan Goals

Take care of the transportation system

Keep all travelers **safe**, no matter the mode of transportation

Invest in projects that spur **economic growth** and create jobs

Give Missourians better transportation **choices**

Freight Plan Goals

Maintain the freight system in good condition

Improve **safety** on the freight system

Support **economic growth** and competitiveness in Missouri

Improve the **connectivity and mobility** of the freight system

Initial Prioritization Requirements

- Projects are located on, linked to, or within the prescribed buffer for the designated **Missouri Freight Network**.
- High cost capital improvement or major **maintenance** projects / Routine maintenance, operations and planning projects **not included**.
- Project is **consistent with selected plan goals and modes**.
- Project is **eligible for federal or state funding**.



Prioritization Framework Examples

Maintenance

- Maintains existing freight network

Safety System

- Improves a high crash location

Economic Development

- On a link of high economic value
- Connects economically distressed areas
- Improves access to freight generator
- Expands or modernizes facilities to support freight

Connectivity & Mobility

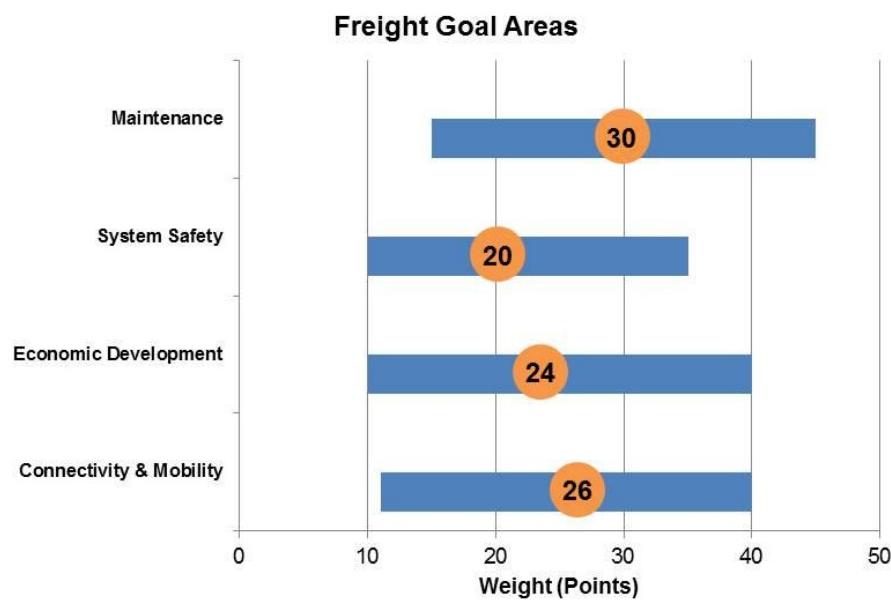
- Adds capacity to the system
- Improves first/last mile connections
- Removes or improves bottleneck
- Addresses substandard infrastructure

Appendix D - Stakeholder Outreach

FREIGHT ON THE MOVE
Freight On The Move
Goals and Filters Weighting Form
Table #

Freight Goal Weight	Freight Filter	Filter Weight
Maintenance	Maintains existing freight network Other: _____ Other: _____	<input type="text"/> <input type="text"/> <input type="text"/>
System Safety	Improves a high crash location Other: _____ Other: _____	<input type="text"/> <input type="text"/> <input type="text"/>
Economic Development	On a link of high economic value Connects economically distressed areas Improves access to freight generator Expands or modernizes facilities to support freight Other: _____ Other: _____	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
Connectivity & Mobility	Adds capacity to the system Improves first/last mile connections Removes or improves bottleneck Addresses substandard infrastructure (weight restricted bridges or track, railroad vertical clearance, river dredging, etc.) Other: _____ Other: _____	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
100		100

Average Range



What Project Types Make Sense?



Highway

- Ramp projects
- Outer road projects
- Corridor operational improvements
- Corridor extensions
- Intersection improvements
- **Continuous safety improvements**
- **General capacity improvements (additional lanes)**
- Third-lane, super-two, passing lanes
- New and/or modified interchanges
- Freeway/highway bypasses
- Bridge improvements and/or replacements
- New river crossings
- **New truck arterials**
- **Rest area and parking improvements**

Improvements and adding capacity to I-70 was the top reoccurring theme

Appendix D - Stakeholder Outreach

Rail

- Grade separation
- Spur lines to industrial parks
- Rail line improvements
- At-grade crossing improvements
- New river crossings
- Third mainline track
- Rail bridge improvements
- Asset management program
- Lighted crossings
- Terminal improvements
- New siding
- Double tracking
- Universal crossover

Waterway/Port

- Land acquisition
- Dock improvements
- Landing and terminal improvements (buildings, storage facilities, equipment)
- Port road improvements
- Bank stabilization
- Container handling
- Floodwall improvements
- Utilities upgrade
- Harbor dredging

Aviation

- Gate access, facility location
- Safety management system
- Airport cargo area connection improvements
- Links to industrial areas

Intermodal

- Multimodal connection enhancements
- Rail-to-port connections (spur and siding improvements, dock transfer)
- Truck-to-air connections
- Truck-to-rail connections
- Food industry-related intermodal facility
- U.S. highway access road improvements

Appendix D - Stakeholder Outreach

Discussion

MoFreightPlan.org

[https://www.surveymonkey.com/s/
MoDOTFreightSurvey](https://www.surveymonkey.com/s/MoDOTFreightSurvey)



Next Steps

- Draft plan ready end of June



Appendix D - Stakeholder Outreach

Thank You!

For more information, contact:

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MoDOT Freight Administrator
cheryl.ball@modot.mo.gov
573-526-5578

Keith Bucklew
CDM Smith Project Manager
bucklewkj@cdmsmith.com
317-829-9629



MoFreightPlan.org

Business Forum Summary

ATTACHMENT 14: Final Document

Appendix D - Stakeholder Outreach



A Vision for Strategic Freight Investment

Building on *A Vision for Missouri's Transportation Future*, MoDOT's long range plan which established the vision for Missouri transportation, and through collaboration with freight partners, MoDOT is developing a Freight Plan to identify opportunities and actions that will increase economic development and jobs. Specifically, MoDOT wants to develop a method for prioritizing investments for improvements on the system.

Freight is a critical element in the Missouri economy and we need a plan to make sure we keep freight - and the Missouri economy - moving smoothly. The goal is to figure out what we can do that will make a difference to keep Missouri businesses competitive and growing and attract new businesses and jobs to the state.

Listening to Missourians

Missouri stakeholders, including logistics directors, shipping managers, and economic development professionals have provided critical input into the development of the Freight Plan.

MoDOT has worked to gather input from stakeholders through:

- **Statewide Steering Committee:** A group of senior MoDOT leadership, representatives of various freight modes, along with economic development professionals are guiding the development of the Freight Plan.

- **Stakeholder Interviews:** More than 50 freight stakeholders, community leaders and economic development professionals from across the state were interviewed to hear their ideas, views and concerns about the current freight transportation system and what actions MoDOT could take that would make Missouri more competitive.

- **Freight Forums:** MoDOT hosted two rounds of regional forums to give freight partners, business, and community leaders a chance to learn more about the Freight Plan, provide input on how MoDOT can best prioritize freight investments and on what types of projects are most important in the area.

Improvements large and small, from turning lanes for trucks to better rail and port connections, keep Missouri businesses competitive and growing and attract new businesses and jobs to the state.



What We Heard - Project Prioritization Framework

As part of the Freight Forums held in early 2014, stakeholders were asked to provide feedback on how

FREIGHT



Appendix D - Stakeholder Outreach

What We Heard - Project Types

Stakeholders were also asked to provide feedback on what types of freight projects would make sense in Missouri. Stakeholders who participated in forums, surveys and webinars across the state said maintaining the existing infrastructure is the highest priority. Additional high priorities in each freight mode are:

Roadways

- Roadway improvements that address first and last mile as well as accommodate wider and heavier loads
- Bridge improvements or replacements to accommodate wider, taller and heavier loads
- Adding lanes
- New truck arterials
- Truck parking facilities

Rail

- Spur lines to industrial parks
- At-grade crossing improvements and grade separations
- Transloading facilities to get from truck to rail and vice versa
- Rail line improvements

Waterway and Port

- Container handling
- Harbor dredging
- Infrastructure and terminal improvements (buildings, storage facilities, equipment)

Aviation

- Links to industrial areas
- Improved connections from airport cargo areas to other modes

How will this input be used?

MoDOT leaders understand how important freight movement is to the Missouri economy and are using the development of this Freight Plan to leverage economic development and identify strategic projects that will make significant improvements to the freight system. The information gathered will help MoDOT be prepared to address future freight issues and articulate what freight projects would be most helpful to the State if additional funds are made available.

A draft plan will be available in September.



Appendix D - Stakeholder Outreach



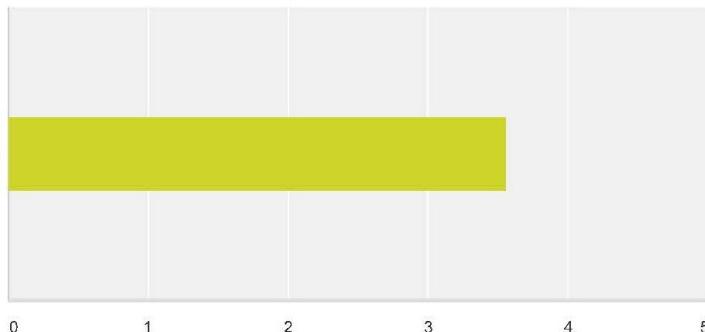
MoFreightPlan.org

Appendix D - Stakeholder Outreach

Stakeholder Comment Period

ATTACHMENT 15: Stakeholder Survey

Q1: On a scale of 1 to 5, with 5 being the most important, how would you rate the current Missouri freight system?



1	2	3	4	5	No opinion	Total	Average Rating
0.00% 0	10.53% 2	36.84% 7	31.58% 6	15.79% 3	5.26% 1	19	3.56

#	Other (please specify)	Date
1	Our highways are over crowded with trucks, and much of our rail infrastructure is decaying.	10/27/2014 6:58 AM
2	too many trucks ... too few interstates	10/22/2014 7:58 PM

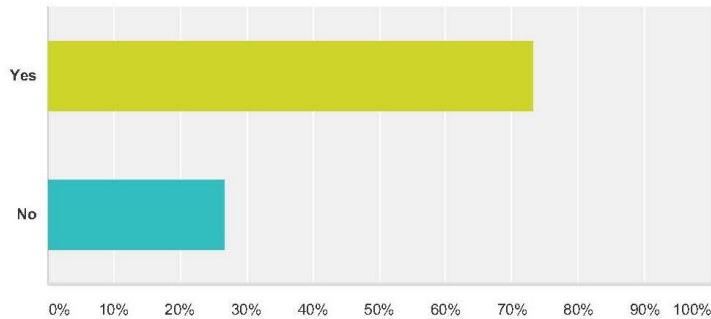
Appendix D - Stakeholder Outreach

Q2: How do you feel that freight movement affects your everyday life?

#	Responses	Date
1	Effective movement of freight does help keep end user product cost minimal.	10/27/2014 6:58 AM
2	Dangerous travel with so much truck traffic	10/22/2014 7:58 PM
3	Very much, it is how I make a living.	10/18/2014 12:33 PM
4	Too many through-traffic trucks on state lettered highways. Could they not be designated to state numbered highways only? The lettered highways were NEVER designed or built to sustain such loads or speed limits, as many were constructed in the thirties, forties and fifties.	10/15/2014 11:35 AM
5	Freight carriers make interstate driving dangerous. Drivers often drive over the speed limit, do NOT slow down, do not move over, etc.	10/10/2014 3:24 PM
6	the items we buy that are not produced or manufactured here in our region probably travel via rail truck, barge, etc., so it is essential we have good infrastructure and policies in place.	10/3/2014 9:25 PM
7	Constantly	10/3/2014 10:45 AM
8	The lack of river freight affects all of us everyday in the form of emissions (trucks,rail) and roadway deterioration.	10/3/2014 6:34 AM
9	Determines the cost of goods and provides for increased standard of living.	10/2/2014 6:31 PM
10	Big trucks on the interstate system are apparently without much regulation. Missouri citizens are at risk every time they are on Missouri roads from incompetent, impaired big truck drivers almost all from out of state. Yet the money spent on the electronic warning signs on the interstate are used to chastise passenger vehicles to stay out of the way of trucks, give them plenty of room. All the while you can not drive 100 miles on 70 or I44 without being run off the road or threatened by an 18 wheeler. These out of state trucks kill our citizens then are given a traffic ticket and climb back in their trucks. Why is Missouri the only state between here and the Atlantic Ocean than does not have reduced speed for big trucks. Why do we not have signs up telling trucks they will be ticketed if they drive up hills 35 miles side by side blocking all lanes. This is not permitted in other states but is in Missouri. Why?	10/2/2014 4:39 PM
11	5	10/2/2014 2:03 PM
12	Somewhat	10/2/2014 10:10 AM
13	Very important. Since every thing that you have in your house had to come by truck on at least one leg of the journey into your life.	10/2/2014 9:39 AM
14	Heavy trucks need to slow down and allow safe passage of pedestrians and bicyclists. Trucks need to pay more in diesel tax and tolls on Hwy70 if there is expansion of lanes.	10/1/2014 2:57 PM
15	Adds to traffic congestion on the Interstates and damages roads.	10/1/2014 2:50 PM

Appendix D - Stakeholder Outreach

Q3: After reading the draft plan, do you feel like we missed anything?



Answer Choices	Responses
Yes	73.33%
No	26.67%
Total Respondents: 15	

#	Additional comments	Date
1	I have always thought the the Rail line between St. Genevieve and Bismarck needs to be brought up to standard. Although the Union Pacific is uninterested in their own property, this line is of great economic importance to the communities that are located along it. Also with the new frac sand mine located in St. Genevieve county the railroad would not allow that industry to use the rail, which in turn cases more truck traffic to be on the roads between St. Genevieve and Bismarck MO, where the material is loaded on rail. I feel a short line railroad would be the best answer to this rail corridor.	10/27/2014 6:58 AM
2	Seems well rounded	10/22/2014 7:58 PM
3	Incentives to keep freight carriers in MO. (Cheaper longer-term licensing for vehicles, UCR, etc....) (Lower tax rates for carriers)	10/18/2014 12:33 PM
4	Restrict through-traffic trucks to state numbered highways only, where practical.	10/15/2014 11:35 AM
5	I did not really see anything about how interstate traffic would be improved -- such as NO Sunday truck traffic (like they have in Europe), designated truck lanes, increased night (10 pm - 6 am) driving and decreased day driving, etc.	10/10/2014 3:24 PM
6	only comment I could make is that selling this vision to the public so as to build support might be useful, but probably hard to do without spending a lot of advertising dollars.	10/3/2014 9:25 PM
7	In a thirty year time frame, there will be intense demand for infrastructure capable of accommodating Autonomous and semi-autonomous trucks. This will impose a huge financial burden but be ESSENTIAL to Missouri's economic competitiveness. We need to begin doing two things: preserving right-of-way, where likely to be required, and work with private interests on politically practical methods of funding the requisite assets as required over time.	10/3/2014 10:45 AM
8	Looking to the future, we should at least have a goal of "changing the pie chart" to show waterways percentage as increasing twofold in ten years.	10/3/2014 6:34 AM
9	Springfield has two major rail yards and four intersecting major highway arterials with relatively little urban sprawl to impede the flow of freight. With the limits and problems associated with maritime freight, why is Springfield not considered for a major freight hub? Also, future fuel prices and truck verses rail fuel cost should be more central to the discussion.	10/2/2014 6:31 PM
10	Did you think that the taxpayers of Missouri who drive passenger vehicles might be "stakeholders" in the Missouri Highway system and we might have an interest in not being killed by big trucks.?	10/2/2014 4:39 PM
11	Need to look at how do develop driving jobs with the shortage that is looming in the future it could be a real problem to move freight.	10/2/2014 9:39 AM
12	More emphasis on truck freight paying tolls and paying more in highway diesel taxes. Pedestrians/Bicyclists and public transit has been neglected far too long in favor of roads for trucks paid for by passenger vehicles. Trucks are responsible for the majority of damage to roads, there needs to be a use fee (tolls, highway diesel additional taxes)	10/1/2014 2:57 PM

Appendix D - Stakeholder Outreach

Q4: What issues or problems identified in the draft freight plan should be tackled first?

#	Responses	Date
1	Rail Infrastructure	10/27/2014 6:58 AM
2	adding rail and waterway capabilities...	10/22/2014 7:58 PM
3	Restrict through-traffic trucks to state numbered highways only, where practical.	10/15/2014 11:35 AM
4	Funding, increasing rail lines and dedicated interstate lanes	10/10/2014 3:24 PM
5	infrastructure maintenance, while linked to expansion in some cases, cannot be allowed to be neglected. I would say it needs to be addressed first.	10/3/2014 9:25 PM
6	Incorporating rapidly evolving, mid 20th technologies into all decision making is the first problem. Figuring out how to fund essential new infrastructure is the most critical.	10/3/2014 10:45 AM
7	Dig deep and often. Mine every scrap of funding that can be used in by Missouri. Example below shows innovation (building an "articulated tug/barge vessel) by state transportation groups in the NE: Marine Highway Momentum from Maine Port Authority Posted by Paul "Chip" Jaenichen The more than 25,000 miles of navigable Great Lakes, rivers, and waterways that make up America's Marine Highway System are --and will remain-- a key economic asset. Our nation's marine highway routes and the tugs and barges that ply those marine highways help alleviate land-side congestion; accommodate future freight growth; and provide reliable, competitive alternatives for freight shippers. However, smooth sailing is not always guaranteed. For example, winter weather can cause the waters off the coasts of New England states --part of M-95, a crucial marine highway running all the way from Maine to Florida-- to be too rough for tugs to safely push or pull cargo-loaded barges. That's why DOT's Maritime Administration (MARAD) has supported the Maine Port Authority's development of a next-level cargo vessel designed specifically to handle that unique marine environment. In addition to increasing safety and reliability for mariners and shippers, the project shows great potential to reduce energy consumption and air emissions while offering relief to cars and trucks on the busy I-95 land-side corridor. This week, port officials took a major step forward in this effort by releasing a design for the first U.S. containerized articulated tug barge, or "ATB," made possible with funding from MARAD. Unlike a tug and barge combination, an ATB is mechanically linked, combining the economics of tug and barge operations with the speed, maneuverability, and heavy weather-reliability of a ship. The vessel proposed by the Maine Port Authority would support the Northeast Marine Highway Expansion Project's efforts to expand container-on-barge service between Newark, NJ; Boston, MA; and Portland, ME. Our strong support for development of this vessel is another in a long line of actions that prove this Administration's commitment to the future of marine transportation and to developing a truly multimodal freight system that increases capacity, supports economic growth, and provides viable alternatives for shippers. Since September 2009, through six rounds of our TIGER grants, this Administration has awarded more than \$100 million to projects developing and increasing use of America's marine highways. Additionally, MARAD has awarded \$6.3 million for marine transportation-related infrastructure and equipment through our Marine Highway Grant program, and we have funded \$700,000 for marine corridor studies. The Obama Administration and MARAD are proud to back America's Marine Highways—not just because they're environmentally-friendly and energy-efficient—but also because we see their potential value in the future. Our nation's expanding population will increase the demands placed on our freight system, and America's waterways are largely-untapped assets with the available capacity our country's growth requires. With continued support from this Administration, and forward-thinking efforts like the work of the Maine Port Authority, I have no doubt that America's Marine Highways will be in a position to keep America moving.	10/3/2014 6:34 AM
8	Rail line removals.	10/2/2014 6:31 PM
9	see above	10/2/2014 4:39 PM
10	Barge improvement of waterways Trucks Major Roads improved Rail-Better Crossing Safety	10/2/2014 2:03 PM
11	More specifics of actual ideas, less talk of theoreticals.	10/2/2014 10:10 AM
12	Interstate expansion.	10/2/2014 9:39 AM
13	Rail is a great way to take trucks of Missouri roads, focus on rail. Take a close look at oil trains running through Missouri.	10/1/2014 2:57 PM

Appendix D - Stakeholder Outreach

Q5: Would you like to add any other questions or comments?

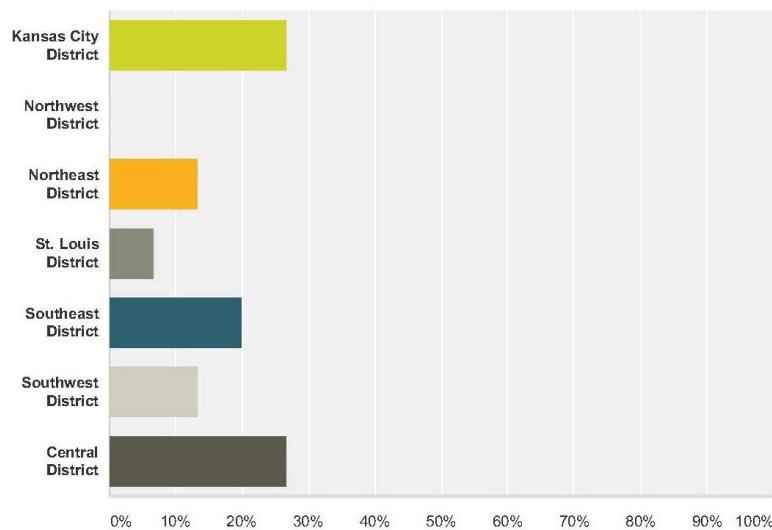
#	Responses	Date
1	Amtrak Service to Springfield would be a nice addition, although not freight, it would provide an alternative to the over crowded passage on I-44	10/27/2014 6:58 AM
2	we need to get back to Railroads....Much more efficient	10/22/2014 7:58 PM
3	Restrict through-traffic trucks to state numbered highways only, where practical.	10/15/2014 11:35 AM
4	I appreciated your comments regarding the need for education about the importance of our freight network, and would like to add that it's important to educate others about the MO River and to strive to have it taken off the list of low use waterways. I overheard a conversation the other day that a representative from the Oklahoma Dept of Transportation was meeting with Kansas Corn Growers, the wheat association and also soybean farmers to express to them the importance of the Arkansas River. I think we need to reach out to our neighbors to the north and west and let them know that the MO River is navigable up to Sioux City and that between Sioux City and New Orleans, we have only one lock and Dam and that would be lock 27 in St. Louis. That equates to 1877 mile of river with only one area of potential problems, when people are looking at deteriorating infrastructure and delays due to closure.	10/14/2014 10:13 AM
5	We need to look at perhaps an alternate to trucks - such as rails -- and see if this is cost effective. I live in a town where there were rail lines and they took them up. We could use those now to help transport goods and keep truck traffic down. Also look at increasing truck traffic at night and decreasing it during the day, and perhaps banning it altogether on a Sunday such as in Europe. We need to look at ways rural areas could contribute to the freight program -- offering parking areas, truck stops, mechanic shops, etc., esp. along interstates.	10/10/2014 3:24 PM
6	Develop study groups that keep updated on all funding such as Tiger Grants, and innovative ways to use the grants on our waterways...	10/3/2014 6:34 AM
7	Why is Joplin part of the freight discussion?	10/2/2014 6:31 PM
8	No	10/2/2014 4:39 PM
9	Final results of freight-All freight at some point is necessary to be moved by Trucks-Major Roads must be maintained	10/2/2014 2:03 PM
10	The public needs to choose what they are paying for, then they will be more apt to supporting it. The online Wish List is a good approach, and should be used continuously, but needs to be fine tuned.	10/2/2014 10:10 AM
11	If I am driving 70 m.p.h. on I-70, I am constantly passed by trucks. Do they have to abide by the speed limit or not?	10/1/2014 2:50 PM

Appendix D - Stakeholder Outreach

Q6: Please provide the following demographic information (OPTIONAL).

Respondents provided contact information in response to this question.

Q7: Please identify which MoDOT district you reside or work in.



Answer Choices	Responses
Kansas City District	26.67% 4
Northwest District	0.00% 0
Northeast District	13.33% 2
St. Louis District	6.67% 1
Southeast District	20.00% 3
Southwest District	13.33% 2
Central District	26.67% 4
Total Respondents: 15	

#	Other (please specify)	Date
	There are no responses.	

Appendix D - Stakeholder Outreach

ATTACHMENT 16: Outreach Events

Outreach was conducted at the following organizations during the public comment period. These events included in-person presentations and email communications with organization members to encourage review of the draft plan.

- Boonslick Regional Planning Commission
- East-West Gateway Council of Governments
- Greater Kansas City Chamber of Commerce
- Hannibal Area Chamber of Commerce
- Joplin Diplomats
- Kaysinger Basin Regional Planning Commission
- Lake of the Ozarks Council of Local Governments Regional Planning Commission
- Meramec Regional Planning Commission
- Mid-Missouri Regional Planning Commission
- Mid-America Regional Council
- Missouri Chamber of Commerce
- Missouri Dump Truck Association Board
- Missouri Farm Bureau
- Missouri Chapter of Association of American Railroads
- Missouri Trucking Association
- Neosho Area Business and Industrial Foundation
- Northwest Missouri Regional Council of Governments
- Ozark Foothills Regional Planning Commission
- Pioneer Trail Regional Planning Commission
- Poplar Bluff Chamber of Commerce
- Port Working Groups
- Springfield Motor Carriers
- St. Louis Chamber of Commerce
- Taney County TAC Board
- St. Louis Transportation Club

Appendix D - Stakeholder Outreach

ATTACHMENT 17: Webinar Presentation



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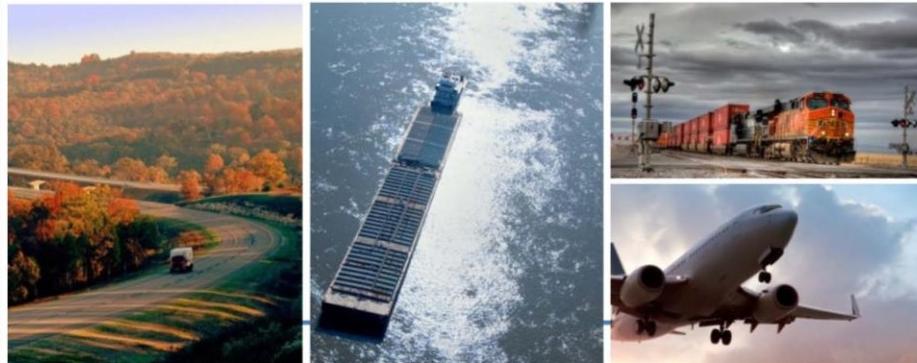


Results

- **Inventory of Freight Assets & Assessment of Needs** –acquired TranSearch and ATRI data not previously used
- **Defined Statewide Freight Network**
- **Prioritization Process** – can be used moving forward
- **Prioritized Project List**
- **Competitiveness Measures** – Tracker 7d
- **Action Plan and Implementation Strategies**



Freight Assets & Assessment of Needs



Why was it created?

- To know what assets the State has and their condition

How was it created?

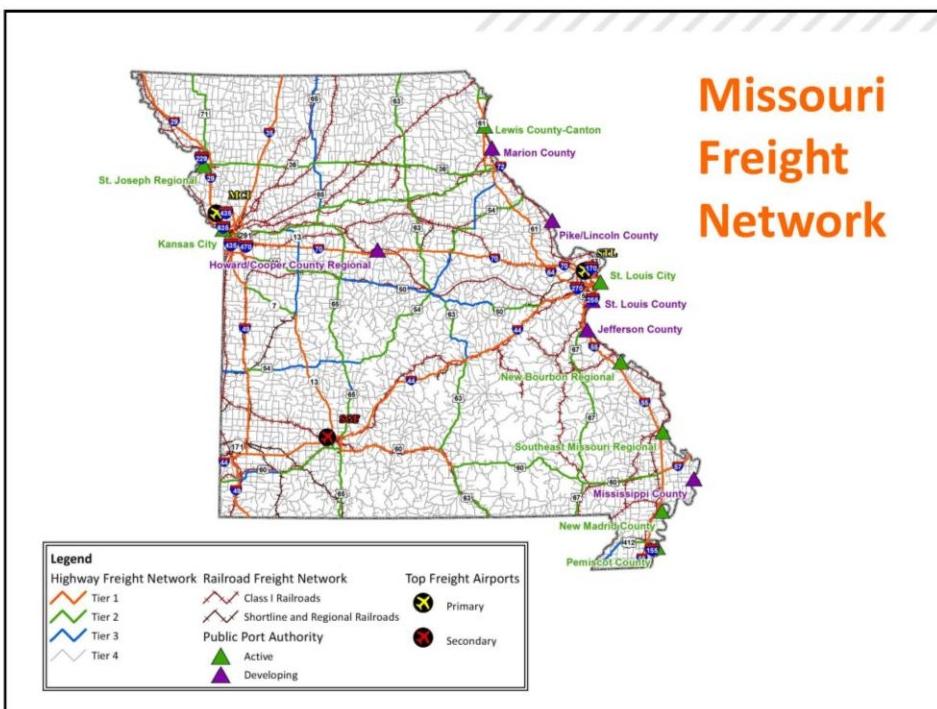
- Asked key stakeholders what we assets we have currently, what condition they are in, and what the state needs to do to be competitive
- Reviewed reports and up to date freight data

What resulted?

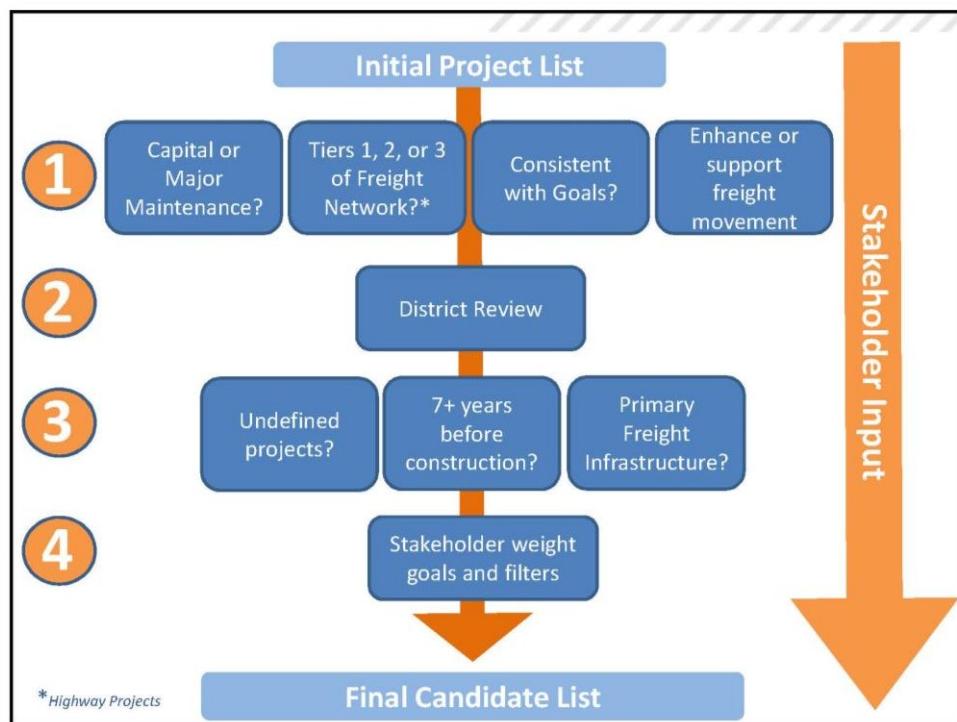
- State Freight Network Map



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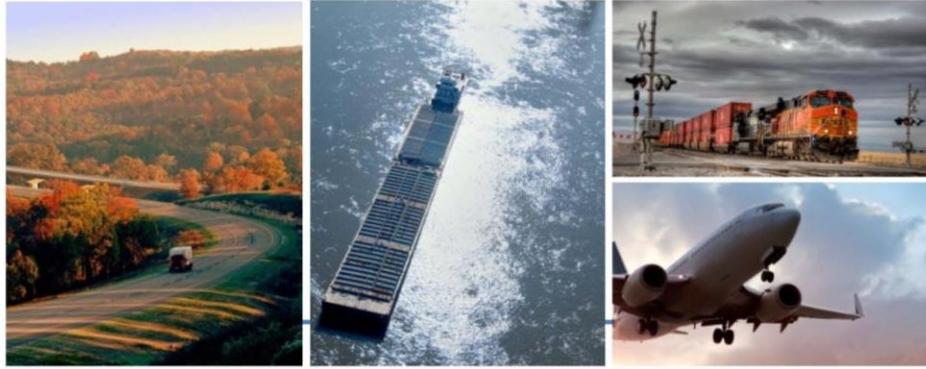


Appendix D - Stakeholder Outreach



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Performance Measures & Metrics



Built on Strong Foundation of Tracker

Freight Plan Goal	Recommended Measures
Maintenance Maintain the freight system in good condition	<ul style="list-style-type: none">Percent of the major highways in good condition*Percent of structurally deficient deck area on National Highway System bridges*
Safety Improve safety on the freight system	<ul style="list-style-type: none">Number of commercial vehicle crashes resulting in fatalities or serious injuries*Rail crossing crashes or fatalities*
Economy Support economic growth and competitiveness	<ul style="list-style-type: none">Goods movement competitiveness*Job and economic growth by key sector, including:<ul style="list-style-type: none">AgricultureManufacturingTransportation/Logistics
Connectivity and Mobility Improve the connectivity and mobility of the freight system	<ul style="list-style-type: none">Freight tonnage by mode*Annual hours of truck delay*Truck reliability index*

* These or similar measures have been established in MoDOT's Tracker

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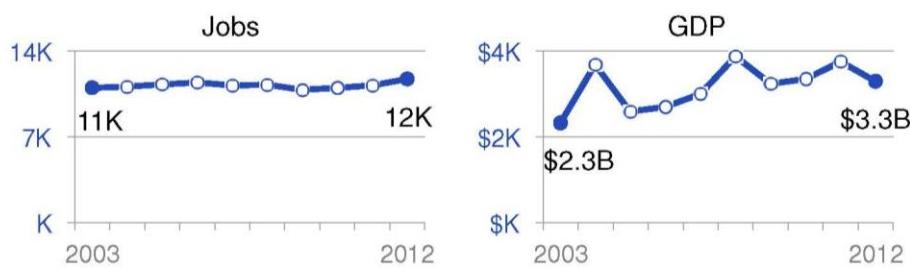
Competitiveness Metric – Soybeans to New Orleans by barge

Cost of Shipping One Ton of Soybeans to New Orleans
(largely by barge)



Economic Growth in Key Sectors – Agriculture

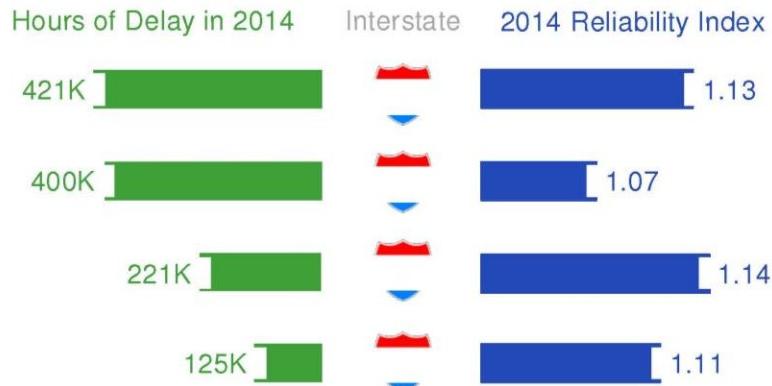
Figure 11: Jobs and Economic Growth in the Agriculture Industry



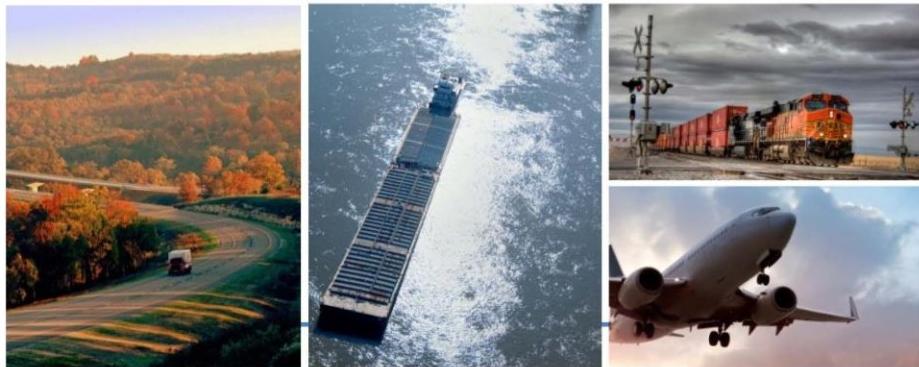
Appendix D - Stakeholder Outreach

Performance Highlight: Truck Delay and Reliability Index

Figure 15: Hours of Truck Delay and Truck Reliability Index



Action Plan and Implementation Strategies



Appendix D - Stakeholder Outreach

- 1** Maintain & improve the freight network
- 2** Use prioritization framework to assist decision-makers
- 3** Expand collaboration with state DED and others

PROGRAM RECOMMENDATIONS

- 4** Develop supportive freight and land use guidance
- 5** Increase public awareness about freight

- 6** Continue engaging statewide eco-devo partners
- 7** Host annual freight roundtable
- 8** Consider developing a rail public-private partnership

PROGRAM RECOMMENDATIONS

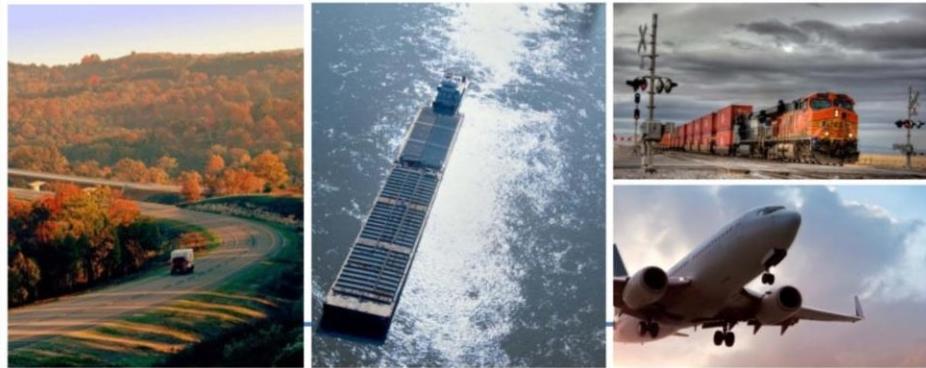
- 9** Identify and preserve critical multi-modal nodes
- 10** Partner with others involved in certified site programs

Appendix D - Stakeholder Outreach

STRATEGY: INVEST IN FREIGHT INFRASTRUCTURE TO DRIVE LONG-TERM JOB CREATION	
Implementation Tactics	Timeframe
Work with MDED/Missouri Partnership to support the Missouri Certified Sites program	Short-term
Leverage private sector investment to gain political support for investment in non-traditional project types.	Short-term
Explore utilizing a rail bank to preserve rail corridors for future needs	Short-term
Continue to explore the use of Private Activity Bonds (PAB) to improve multimodal connectivity facilities	Short-term
Study programs like "In Lieu Fee" for their ability to encourage short-line investment	Short-term
Monitor neighboring states truck licensing fees to limit leakage from what little state multimodal funding is available	Short-term

STRATEGY: INVEST IN FREIGHT INFRASTRUCTURE TO DRIVE LONG-TERM JOB CREATION	
Implementation Tactics	Timeframe
Ensure planning and project selection processes considers rural accessibility/just in time performance	Intermediate
Streamline and work to reinstate the Rapid Response Cost-Share program	Intermediate
Study the feasibility of alternative funding sources for future needs	Intermediate
Create statewide programmatic freight selection process and work with districts to supplement district processes	Long-Term
Continue to advocate for dedicated revenue for multi-modal investment	Long-Term

Freight Advisory Committee



Freight Advisory Committee

- Representatives from:
 - Public sector
 - Private companies
 - Elected or appointed officials?
 - OTHERS?
- Regional or Statewide?
- Interaction with Planning Partners?
- Defining the committee's role?



Appendix D - Stakeholder Outreach



Key Questions for you:
Do you think the plan reflects the goals?

**Do you think the plan reflects what
you've told us?**

Who else should we be consulting?

What have we missed?

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Your input is valuable to the development of the State Freight Plan.

Continue to stay involved:

- MoFreightPlan.org
 - Webinar
 - Surveys/comments
- Contact Cheryl Ball, Freight and Waterways Administrator-Cheryl.Ball@modot.mo.gov



Appendix D - Stakeholder Outreach

ATTACHMENT 18: Draft Plan Comments

Stakeholders provided the following comments which were considered in finalizing the State Freight Plan.

Edits/Revisions:

- [The executive summary] misspelled bottleneck on page 12 and left "St." off of St. Joseph on [the] freight network map [on] page 30.
- [On page 20 of the executive summary,] instead of "program to improve," [I] suggest" program to support". Instead of using "Cl 3," call them "regional railroads." It will make more sense to readers.
- [On page 26 of the executive summary,] change "invest in freight infrastructure" to "invest." Would it take a CA or a statute to allow [more] flexibility in funding for Missouri to invest in railroad too?
- [On page 26 of the executive summary,] enhance the resiliency of the freight system. [There is a] need for maintaining the flexibility of freight system as a short-term complex environment. Freight supply moves quickly, we have to be able to adapt. It appeared here [that] they were discussing keeping ability to make project investments in short-term flexible, instead of programming and tying up funds for years in the future.
- [In] chapters 3 to 12, [the] yellow dots are port to truck to rail. Ports are not on [the] intermodal map, and neither are railroads.
- [On chapter 3-4,] Amtrak doesn't own any track. [You] need to change sentences to reference owning the track and Amtrak using the track.
- [On chapter 5-12,] second bullet, short lines are already. NW – this appears that they are being removed now. I suggest [changing] to were removed adversely affecting economic development.
- Last bullet, [chapter 5-11], where is it? First bullet – a little explanation of why; weave trespassers in, please. Third bullet – why [is] only Howard-Cooper called out? Several ports are looking for access. [I] suggest stating "ports" or naming all [of them]. Fourth bullet – "merchants" needs moved up on the list. It is a top three issue. Mention that it is an issue of national freight importance, not just Missouri freight.
- [On chapter] 7-3, Cl. 1 are regulated heavily on [the] federal level by [Surface Transportation Board] and others. The sentence, as worded, leaves [an] impression that no one regulates them. Please modify.
- [On chapter] 7-6, railroad expense fund says it is PSC, but this goes to MoDOT now.
- [On chapter] 9-6, change "challenge" to "challenge/opportunity" in bullet seven.
- The "Bottleneck" of Belt Highway 169 from US 36 to I-29 seems odd (wrong). This is a five-lane road intending to give access to business. What information led to us saying this is a bottleneck? What the northwest district has identified is improvements to the I-29 and US 169 interchange on the south connection (Love's Truck Stop). Maybe the Table 9-5 Route should be changed to I-29 and US 169 south and leave the "To/From" blank. That would add some clarity. The interchange ramps were in the CA7 proposed project list. We've taken the stance that this project may need to be on hold until such time as the bridges deteriorate significantly. While the interchange is not ideal, an improved interchange is difficult to justify.
- [Chapter 4-10 uses the] wrong Union Pacific Line.
- [I] would like to see chapter [7-5 and 7-6] include some information on funding sources for the modes, I believe that is directed at 7-2 and 7-3, and somewhere in the plan a little about who pays for maintenance of each type of asset once constructed.
- [I suggest] adding tracker measure impacts to prioritization process.

Appendix D - Stakeholder Outreach

Railroad Specific:

- [Page six of the executive summary should] *list some commodities [such as] auto and intermodal.* [It would be helpful to] *weave some of the Association of American Railroads website information on the intrastate too.* [The] goal [should include helping] people understand that rail is more than coal moving. It is containers of many goods.
- [On page 19 of the executive summary,] *land use is important to railroad.* [It would be helpful if] *a safety message about keeping people separate from the rail lines* [could be added].
- *The railroad [is] asking us to keep in mind that projects need to be looked at both regionally and statewide.*
- [The] railroad would like [a] small group of contacts for project discussion, [and] would prefer it to be Eric, Cheryl and Michelle, not each district. The method use for [the] CA7 project was too complex and a drain on their resources. We are a small part of their multi-state responsibility, so having them participate in multiple meetings within seven regions of our state, is a drain. In addition, they agree that the regional project selections work well for moving things within that region. However, [they] request statewide or multi-state evaluation of the freight system and projects to support it.
- *The railroad would like to be a one stop shop for issues at MoDOT with staff who are experienced and understand the many issues [that are] on-going.*
- *FAC would like each of the Cl 1s to have a seat at the table, or at least be invited for [the southwest] group. They will only have a handful of potential projects overall.*
- *[The State] need to make sure that the rail industry is covered and that the Plan considers improvements to the rail system.*
- *Springfield has two major rail yards and four intersecting major highway arterials with relatively little urban sprawl to impede the flow of freight. With the limits and problems associated with maritime freight, why is Springfield not considered for a major freight hub? Also, future fuel prices and truck versus rail fuel cost should be more central to the discussion.*
- *MoDOT reminding everybody of the instrumental role it played in construction of the Sheffield Flyover and Argentine Connection here in the Kansas City [is a positive]. Add to that the improvements that MoDOT has facilitated on the Union Pacific corridor between Kansas City and Chicago in the name of improving on-time performance of Amtrak's Missouri River Runner and laying the groundwork for both faster service and additional frequencies. The latter improvements have significant benefits for freight traffic on [Union Pacific].*
- *I have always thought the rail line between St. Genevieve and Bismarck needs to be brought up to standard. Although Union Pacific is uninterested in their own property, this line is of great economic importance to the communities that are located along it. Also, with the new frac sand mine located in St. Genevieve County, the railroad would not allow that industry to use the rail, which in turn causes more truck traffic to be on the roads between St. Genevieve and Bismarck, Missouri, where the material is loaded on rail. I feel a short line railroad would be the best answer to this rail corridor.*

Highways/Roadways:

- [In terms of] showing Missouri military installations as freight stakeholders in their Statewide Freight Plan, it is understood that there may be times when the military does not want to share information on their movements, but they should cooperate with MoDOT on the types of vehicles that use [The Strategic Highway Network] and other roads with the National Network.

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- *Embedded in the Plan are some of the MAP-21 directives (truck parking and the use of performance measures, but [!] did not see how this Plan connects with oversize and overweight vehicle regulations (23CFR 657 and 658). As you know, MoDOT is responsible for submitting a State Enforcement Plan (SEP) and Certification (Governor signed) each year. Recognition of the SEP/Certification and how recommendations from the SEP/Certification should be linked to the SFP.*
- *[There are] too many through-traffic trucks on state-lettered highways. Could they not be designated to state numbered highways only? The lettered highways were never designed or built to sustain such loads or speed limits, as many were constructed in the 30s, 40s and 50s.*
- *We need to look at an alternate to trucks, such as rails, and see if this is cost effective. I live in a town where there were rail lines and they took them up. We could use those now to help transport goods and keep truck traffic down. Also, look at increasing truck traffic at night and decreasing it during the day, and perhaps banning it altogether on a Sunday, such as in Europe. We need to look at ways rural areas could contribute to the freight program, [such as] offering parking areas, truck stops and mechanic shops.*
- *I did not really see anything about how interstate traffic would be improved, [such as] no Sunday truck traffic, designated truck lane, increased night driving [or] decreased day driving.*
- *Big trucks on the interstate system are apparently without much regulation. Missouri citizens are at risk every time they are on Missouri roads [due to] incompetent, impaired big truck drivers [who are] almost all from out-of-state. Yet, the money spent on the electronic warning signs on the interstate are used to chastise passenger vehicles to stay out of the way of trucks [and to] give them plenty of room. All the while, you cannot drive 100 miles on I-70 or I-44 without being run off the road or threatened by an 18-wheeler. These out-of-state trucks kill our citizens, then are given a traffic ticket and climb back in their trucks. Why is Missouri the only state between here and the Atlantic Ocean that does not have reduced speeds for big trucks? Why do we not have signs up telling trucks they will be ticketed, if they drive up hills [for] 35 miles side-by-side, blocking all lanes? This is not permitted in other states, but is in Missouri, why?*
- *[There needs to be] more [of an] emphasis on truck freight paying tolls and paying more in highway diesel taxes. Pedestrians, bicyclists and public transit has been neglected far too long in favor of roads for trucks paid for by passenger vehicles. [Since] trucks are responsible for the majority of damage to roads, there needs to be a use fee.*
- *Freight affects everyday life in that it adds to traffic congestion on the interstates and damages roads.*
- *If I am driving 70 miles per hour on I-70, I am constantly passed by trucks. Do they have to abide by the speed limit or not?*
- *MoDOT should continue to focus on improving the highway system and coordinating between freight providers and local governments to provide for multimodal connections.*
- *Freight movement in southeast Missouri relies heavily on Interstate 55, Interstate 57, Route 60, Route 67 and Route 412. Truck traffic accounts for 45% of the traffic volumes on I-55, south of Route 60. We, in Missouri, need to understand the freight movement and traffic patterns in adjacent states.*
- *In Arkansas, the I-40 between Memphis and Little Rock is operating with truck volumes over 50%. Improving the interstate corridors in Missouri, such as US 67 and US 412, will help provide relief to I-40.*
- *In Kentucky, the US 51 Bridge over the Ohio River between Cairo, Illinois, and Wickliffe, Kentucky, was opened to traffic as a toll facility on November 11, 1936. The 76-year-old structure is officially termed "functionally obsolete" because it does not meet current traffic standards. The US 62*

Appendix D - Stakeholder Outreach

Bridge over the Mississippi River between Wyatt, Missouri and Cairo, Illinois was built in the same time period and is "functionally obsolete," as well. A new bridge is being planned over the Ohio River by the Kentucky Transportation Cabinet. The location will be critical to freight movement in Missouri.

- *The current plan to replace the Ohio River Bridge between Cairo, Illinois, and Wickliffe, Kentucky, at its current location seems to not solve this problem. It appears that a better plan would be to build a four-lane bridge north of Cairo, connecting to US 60 in Kentucky with a four-lane road from Kevil to Barlow and continuing to a new bridge over the Ohio River, connecting to I-57 north of Cairo. This would allow four-lane traffic all the way across the southern part of Missouri going west, connecting with the interstate highway system at Springfield, Missouri and east to Paducah, Kentucky and further east to Nashville, Tennessee via I-24 or continuing east through Kentucky to other eastern areas via four-lane roads. This bridge issue currently involves the states of Kentucky and Illinois, since this is where the bridge will connect, but this will affect traffic in Missouri.*
- *Currently, there are only two crossings of the Mississippi River, at St. Louis and Memphis, for freight traffic to go both east and west via four-lane roads or interstate highways. Traffic coming out of southern Illinois, southern Indiana and Kentucky has no easy access going west, while southern Missouri cannot go east without either going north to St. Louis, or south to Memphis. Both of these options incur additional time and costs to truckers.*

Waterways and Ports:

- *It's important to educate others about the Missouri River and to strive to have it taken off the list of low-use waterways. I overheard a conversation the other day that a representative from the Oklahoma Department of Transportation was meeting Kansas Corn Growers, the Wheat Association and also soybean farmers to express to them the importance of the Arkansas River. I think we need to reach out to our neighbors to the north and west and let them know that the Missouri River is navigable up to Sioux City, and that between Sioux City and New Orleans, we have only one lock and dam. That equates to 1,877 miles of river with only one area of potential problems, when people are looking at deteriorating infrastructure and delays due to closure.*
- *[I] desire to see maritime freight more prominently referenced within the plan.*
- *We provide transportation opportunities for our customers by using the Missouri River. We can tap into the global marketing by using the Missouri River. There is a lot of freight moving on the river [that] most people do not know about. Your study only shows public ports, which portrays [that] nothing is going on in [the] Missouri River. There [are] ways to work with private terminals to gain benefit to the State of Missouri. We move over 100 loads up the Missouri River to various locations all the way to Sioux City. Please include this movement in your study.*

Graphics/Aesthetics:

- *[The] comments were focused on moving forward and how we collaborate and try to develop mutually beneficial data sources. [Stakeholders] gave big kudos to the [executive summary]. [The stakeholders commented that] it was graphically appealing and very easy to read. They asked how we incorporated new technology into our goals and strategies. They [also] asked how we will use rec#9 to add to [the] freight map or to do a SWOT analysis on the identified network.*

General Suggestions/Questions:

- *[It] seems like a project list appears and then is vetted for prioritization and then passed through to respected planning processes. Goals and performance measures were identified, but what came first, the project or the project born from a systematic process to come up with the project?*

Appendix D - Stakeholder Outreach

- *What sector is driving the Missouri economy? [I'm] not certain that [the Department of Economic Development] understands how important rail industry is to attracting targeted industries. [I] would like [the] freight plan [executive summary] to help convey [the] message that rail access is important to the [manufacturing] industries.*
- *[I have a] generally positive response. [My] only concern [is] centered around private industry participation.*
- *Consider doing the regional freight groups similar to how [the] blueprint has divided regions, [as well as] developing [a] freight advisory.*
- *[One group at a presentation] asked how much cargo was moved [through] Columbia Regional Airport and what their ranking [is] nationally.*
- *[The] Civic Council offered help in coordinating [the] regional priorities discussion with their business leader members around freight.*
- *There is a need for North [and] South connections out of the State. Also, the state should be planning to take advantage of the Panama Canal connection.*
- *[I am] disappointed [that] this plan is still modal focused and MoDOT didn't set out a transportation direction for the State, instead of continuing to look at regional priorities.*
- *[I] hate the Tennessee [railroad] program, [but I] like their gas tax exemption. [I] suggest we add the Oregon model, where [the] first and last mile improvements have a recapture rate on the moves on that line, where the industry pays back to the expenses. [I] would like to see that mentioned in our plan.*
- *[I suggest adding information regarding] truck ferries.*
- *If there is a way to better call out the locations of the intermodal Facilities in St. Louis and Kansas City, that might help the reader.*
- *I know the methodology for Freight Generators is called out earlier in the document, but with ample free space on [chapter 3-13], perhaps a reminder as to how Freight Generators were determined, methodology, etc. [may be helpful].*
- *The expansion of the Panama Canal is expected to lead to growth in freight movements in Missouri. This growth will result in increasing demands on the highways, rail lines, port facilities and airports handling cargo. Page 11 later contradicts the statement, "...the timing and scale of the [Canal] impacts on Missouri freight flows are unknown." Do we know this to be certain? From what we continue to read [and] hear, the impacts of the Canal are still to be determined.*
- *There are two bridges across the Mississippi River in St. Louis and both are in poor to very poor condition. So, while there is redundancy in the system, the condition of the bridges presents a problem. The condition of these bridges needs to be improved. It is EWG's understanding that the [Terminal Rail Road Association] (TRRA) considers these bridges to be under-capacity and efforts are already underway to improve their conditions/capacity. I think the language on the condition of these rail bridges needs to change, unless TRRA has said differently.*
- *Ensure that bicycle and pedestrian accommodations are included in the purpose and need of future grade separations and crossings intermediate. This timeframe should be short-term. All modes, at all stages of the planning process, should be accommodated for, if possible.*

Miscellaneous:

- *[There] need[s] [to be] more [of a] focus on water and air.*
- *Heck of a good job on the freight plan website. Kudos to all of you!*
- *[I] liked that we had [a] prioritization process [that] they could use as [a] starting point for regional discussion*

Appendix D - Stakeholder Outreach

- Water is [essential to] life. We need it for everything. [I] have always thought that Missouri should put in dams and locks on the Missouri River. [I] don't want to end up like California.
- Selling this vision to the public, so as to build support, might be useful, but probably hard to do without spending a lot of advertising dollars.
- The Plan missed. In a 30 year timeframe, there will be intense demand for infrastructure capable of accommodating autonomous and semi-autonomous trucks. This will impose a huge financial burden, but [will] be essential to Missouri's economic competitiveness. We need to begin doing two things; preserving right-of-way, where likely to be required, and work with private interests on politically practical methods of funding the requisite assets as required over time.
- Develop study groups that keep updated on all funding, such as TIGER Grants and innovative ways to use the Grants on our waterways.
- Dig deep and often. Mine every scrap of funding that can be used by Missouri.
- MoDOT missed incentives to keep freight carriers in Missouri. [These incentives include] cheaper longer-term licensing for vehicles [and] lower tax rates for carriers.
- All freight at some point [must] be moved by trucks. Major roads must be maintained.
- The public needs to choose what they are paying for, [and] then they will be more apt to support it. The online "Wish List" is a good approach, and should be used continuously, but needs to be fine-tuned.
- [MoDOT] needs to look at how to develop driving jobs. With the shortage that is looming in the future, it could be a real problem to move freight.
- MoDOT acknowledging Missouri's potential for playing an expanded role in national freight movement [is a positive].
- Commendable work. Priorities, for the most part, are correctly placed on maintaining the system and collaboration.
- Direct funding for freight modes, where not required, may be both costly for the taxpayers and deleterious for general efficiency of the State's freight movement.
- Our highways are overcrowded with trucks and much of our rail infrastructure is decaying.
- Amtrak service to Springfield would be a nice addition. Although not freight, it would provide an alternative to the overcrowded passage on I-44.
- [There are] too many trucks [and] too few interstates.
- Travel [is dangerous] with so much truck traffic.
- We need to get back to railroads. [They are] much more efficient.
- [I] want to maintain exemption under the design/build by Missouri statute.

Appendix E: Goals and Performance Measures

This technical memorandum outlines the goals of MoDOT State Freight Transportation Plan and the performance metrics that will be used to develop the plan and support its implementation.

Introduction

The Missouri State Freight Plan goals and performance measures will establish the strategic foundation upon which the Plan can be built and implemented.

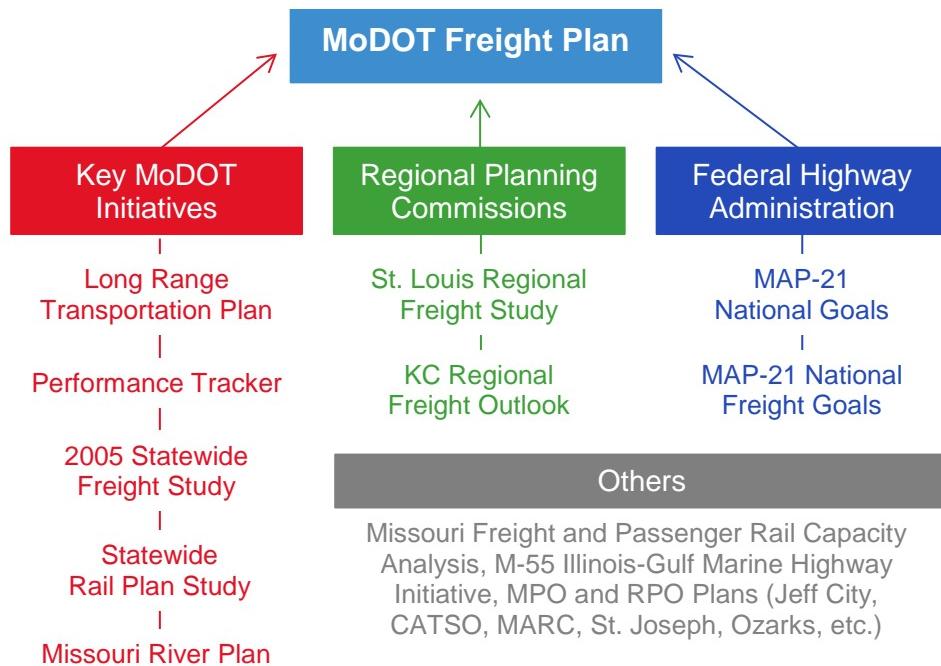
- A broad range of considerations was taken into account when establishing the goals and measures. These considerations are detailed in this appendix, and include a variety of MoDOT efforts as well as initiatives led by its partners such as FHWA and the regional planning partners in Kansas City (MARC) and St. Louis (East West Gateway).
- The goal areas for the plan, which are detailed in this appendix, align with those established during MoDOT's extensive public engagement effort On the Move and the subsequent 2013 Long Transportation Range Plan. They are:
 - Maintenance
 - Safety
 - Economy
 - Connectivity
- For each of these goal areas, a strategically selected set of performance measures will be used to craft and implement the Freight Plan. These measures, which are introduced in this appendix, are built on MoDOT's strong record of performance management, best illustrated by *Tracker* - the Department's well known quarterly performance measurement publication.
- Also in this appendix is an outline of how the goals and performance measures might be integrated with the remaining components of the Freight Plan and the next steps necessary to do so.

Considerations

Freight infrastructure investment decisions in Missouri are influenced by a broad range of considerations, including MoDOT's strategic direction and system plans and the needs and activities of MoDOT's partners in the delivery of freight infrastructure. As such, it is important that the State Freight Plan not stand alone but instead align and be informed by the national, state, and local plans and policies that already exist or are in development. Figure E-11 illustrates these considerations and is followed by a brief summary of each initiative.

Appendix E – Goals and Performance Measures

Figure E-1: Considerations into the MoDOT State Freight Plan Goals



Key MoDOT Initiatives

MoDOT Long Range Transportation Plan

The 2014 Long Range Transportation Plan (LRTP), titled *A Vision for Missouri's Transportation Future*, included the extensive *On the Move* public and stakeholder outreach effort. This outreach effort, coupled with a technical needs analysis, laid the groundwork for the establishment of four goals for meeting Missourians' expectations for their transportation system, including:

- Take Care of the Transportation System and Service We Enjoy Today
- Keep All Travelers Safe, No Matter the Mode of Transportation
- Invest in Projects that Spur Economic Growth and Create Jobs
- Give Missourians Better Transportation Choices

Tracker

MoDOT's *Tracker* is a quarterly publication of departmental performance measures that documents MoDOT's progress. It includes more than 50 performance measures directly linked to the department's mission, values and priorities. The measures gauge performance in seven "Tangible Results" areas, including:

- Keep Customers and Ourselves Safe
- Keep Roads and Bridges in Good Condition
- Provide Outstanding Customer Service
- Deliver Transportation Solutions of Great Value
- Operate a Reliable Transportation System
- Use Resources Wisely
- Advance Economic Development

Appendix E – Goals and Performance Measures

Many of the performance measures contained in the Tracker are directly related to the movement of freight and provide a foundation for establishing measures for the Freight Plan.

Statewide Freight Study

MoDOT undertook the Missouri Statewide Freight Study in 2005 as a precursor to an update of a previous LRTP. The Study's primary objective was to study the movement of freight through all modes of Missouri's transportation system in an effort to improve efficiency and safety throughout the system. The Study included five goals:

- Improve Freight System Reliability
- Develop Freight Data and Measure Performance
- Strengthen Intermodal Connectors
- Use Technology to Enhance Freight Operations
- Involve Freight Stakeholders in the Process

Missouri Statewide Rail Plan

The Missouri State Rail Plan, completed in May 2012, provides the strategic framework for passenger and freight rail service in Missouri for the next 20 years. It establishes Missouri's rail vision "to provide safe, environmentally-friendly transportation options supporting efficient movement of freight and passengers, while strengthening communities and advancing global competitiveness through intermodal connectivity."

The Plan evaluates the existing conditions and current and future capacity needs of Missouri's railroad system, and sets forth the following goals:

- Promote the Efficient Movement of Passengers
- Promote the Efficient Movement of Freight
- Encourage Intermodal Connectivity
- Enhance State and Local Economic Development
- Promote Environmental and Socially Responsible Rail Transportation Development
- Promote Safe and Secure Railroad Operations

Missouri River Plan

The 2011 Missouri River Freight Corridor Assessment and Development Plan outlines the steps needed to redevelop the Missouri River as a freight corridor with reliable service that support a sustainable market and logistics system. The plan sets forth the following "concepts of operations":

- Steps should be taken to realize the potential of returning the traditional market commodities to the River
- Infrastructure and terminal upgrades are needed to handle a potential shift from land transportation mode to the River
- Emerging markets provide an opportunity for growth but will be more challenging to develop
- Advocacy plays an important role in promoting sustainable freight infrastructure
- Guidance for maintaining freight movement when water levels are above or below optimal conditions is critical

Regional and Local Initiatives

St. Louis Regional Freight Study

The St. Louis Regional Freight Study examines the regional freight needs and identifies strategies to anticipate and take advantage of economic opportunities. The study's recommendations include:

- Implement a Regional Freight Transportation District
- Pursue a "Sector Champion" strategy for freight and logistics (similar to that of the plant and life sciences industries)
- Align economic development with supply chains
- Increase freight speeds and railroad network access

Appendix E – Goals and Performance Measures

- Complete a rail network study for the Region, with the active participation of the Class 1 and Short Line Railroads.
- Develop a more robust regional freight Geographic Information System (GIS) supported by performance metrics
- Re-engage with the private sector and pursue public-private strategies to move toward a smaller number of high capacity port terminals
- Emphasize strategies to assemble/reuse older waterfront sites
- Improve monitoring of truck traffic levels on key arterials and near intermodal yards
- Initiate studies to widen the I-270 New Chain of Rocks Bridge to 3-lanes and focus improvements on Hall Street and Route 3 where viable business locations conflict with old infrastructure

Kansas City Regional Freight Outlook

The Mid-America Regional Council (MARC) and Kansas City SmartPort initiated the Kansas City Regional Freight Outlook (RFO) in collaboration with the Kansas and Missouri DOTs in 2009. The RFO was intended to sustain and expand the region's presence in the transportation and logistics industries. The RFO identified the following objectives and critical actions:

- Improve goods movement system performance
- Support transportation and logistics business attraction and retention
- Contribute to ensuring the region's quality environment
- Focus on transportation-related project to identify and highlight freight-related benefits
- Expand the use of existing technologies and tools to monitor freight-specific data
- Recognize the Corridors of Freight Significance – corridors characterized by their service for freight at a National, Regional, or Local level - and conduct regional assessments
- Focus on attraction of transportation and logistics industries
- Improve marketing efforts by emphasizing the competitive advantage of the region

Federal Initiatives

MAP-21 National Goals

The most recent federal surface transportation act, Moving Ahead for Progress in the 21st Century (MAP-21) establishes a performance and outcome-based program and requires states to demonstrate and achieve progress towards seven national goals. The goals are:

- Safety – To achieve significant reduction in traffic fatalities and serious injuries on all public roads
- Infrastructure Condition – To maintain the highway infrastructure asset system in a state of good repair
- Congestion Reduction – To achieve a significant reduction in congestion on the National Highway System
- System Reliability – To improve the efficiency of the surface transportation system
- Freight Movement and Economic Vitality – To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development
- Environmental Sustainability – To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- Reduce Project Delivery Delays – To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through elimination delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices

MAP-21 National Freight Goals

Map-21 requires US DOT to develop a National Freight Policy that will include the following goals for the national freight system:

- Economic Competitiveness – Invest in infrastructure improvements and implement operational improvements that strengthen the contribution of the national freight network to the economic competitiveness of the U.S., reduce congestion, and increase productivity
- Safety, Security and Resiliency – Improve the safety, security, and resilience of freight transportation
- State of Good Repair – Improve the state of good repair of the national freight network

Appendix E – Goals and Performance Measures

- Advanced Technology – Use advanced technology to improve the safety and efficiency of the national freight network
- Performance and Accountability – Incorporate concepts of performance, innovation, competition, and accountability into the operation and maintenance of the national freight network
- Economic Efficiency – Improve the economic efficiency of the national freight network
- Environmental – Reduce the environmental impacts of freight movement on the national freight network

Other Initiatives

In addition to those described above, several other ancillary plans and initiatives were used to inform the development of the Freight Plan's goals and performance measures. Details about each can be found in Appendix A, including:

- M-55 Illinois-Gulf Marine Highway Initiative
- Missouri Freight and Passenger Rail Capacity Analysis
- Columbia Area Transportation Study Organization (CATSO) Long Range Transportation Plan
- 2035 Capital Area Metropolitan Planning Organization (CAMPO) Metropolitan Transportation Plan (MTP)
- MARC Long Range Transportation Plan – Transportation Outlook 2040
- Greater St. Joseph Area MPO 2040 MTP
- Ozarks MPO 2035 LRTP

Summary of Inputs

This research has provided a clear and strong foundation from which the Freight Plan goals and performance measures were established. Although these efforts stem from a diverse group of organizations with different intentions and motivations, the majority of the findings can be classified into a handful of what have become industry-standard categories. Figure E-2 illustrates how each of the plans' goals aligns within the categories.

Appendix E – Goals and Performance Measures

Figure E-2: Goals for Key Freight Plan Inputs



The Missouri Freight Plan – Cross Comparison of Goals and Issues

Goal Category	Key MoDOT Initiatives					Federal Highway Administration MAP-21 National Goals (2011)	Regional Planning Organizations St. Louis Freight Study (2013) Kansas City Freight Outlook (2009)	
	Long Range Plan (2014)	Tracker Tangible Results (updated quarterly)	Statewide Freight Study (2005)	Missouri River Freight Plan (2011)	Statewide Rail Plan (2011)			
Maintenance & Preservation	Maintenance	Keep roads and bridges in good condition		Minor maintenance is needed		Infrastructure Condition	Improve state of good repair on the freight system	Maintain the region's freight network
Safety	Safety	Keep customers & ourselves safe		Promote safe and rail operations	Safety	Improve safety on the freight system		
Economy	Economic Development	Advance economic development	Improve freight system reliability	Redevelop and expand traditional freight markets	Enhance economic development	Freight Movement & Economic Vitality	Improve freight contribution to competitiveness	Stay ahead of demands to truck-heavy intersections Target high growth commodities & leverage new opportunities
Mobility	Connections and Choices	Operate a reliable & convenient system	Strengthen intermodal connectors	Promote market expansion and identify port needs	Encourage modal connectivity & efficient freight movement	Congestion Reduction & System Reliability	Reduce congestion on the freight system	Increase rail capacity Leverage region's low transportation costs
Environment	Environmental responsibility			Promote environmental responsible rail development	Environmental Sustainability	Reduce adverse environmental impacts of freight		
Processes & Organization	Performance Management	Use resources wisely	Develop freight data and measure performance	Identify management approaches to optimize freight river movement	Reduce Project Delivery Delays	Use technology and performance measures in operating the freight system	Explore revenue increases	Institutionalize freight in the planning process
Customers & Partners	Planning Framework	Deliver solutions of great value	Enhance freight technology (ITS) operations	Organized cooperation could improve reliability			Consider truck focused wayfinding system	Foster public/private partnerships

The Missouri Freight Plan | Goals and Measures



Recommended Goals

Based on the considerations above and the strategic input of the Steering Committee, four goal areas for the State Freight Plan have been identified. These goal areas reflect what Missourians told MoDOT during *On the Move* and mirror the four goals of the Long Range Plan. They also align well with both MAP-21's national freight policy provisions and with other recent statewide and regional freight studies. MoDOT Freight Plan Goals are:

- **Maintenance** - Maintain the freight system in good condition by keeping highways and bridges in good condition and supporting the maintenance of railways, waterways, airports, and multimodal connections
- **Safety** - Improve safety on the freight system by decreasing the number and severity of crashes involving commercial vehicles and improving safety at railroad crossings.
- **Economy** - Support economic growth and competitiveness in Missouri through strategic improvements to the freight system
- **Connectivity and mobility** - Improve the connectivity and mobility of the freight system by reducing congestion and increasing reliability on the roadways, by supporting improved efficiency of rails, waterways, and airports, and by improving connections between freight modes.

These goals are mostly related to the performance of the freight system itself. In addition to these system-related goals, there are also strategic considerations that are related to the planning process, collaboration with freight stakeholders, and ultimately the implementation of the Freight Plan. These process and program delivery considerations include:

Appendix E – Goals and Performance Measures

- **Environmental** - Reduce and/or mitigate adverse environmental impacts of freight
- **Organizational & Process** - Institute policies and practices that support the freight system, such as exploring funding flexibility and stability and using technology to improve operations on the freight system
- **Customers & Partners** - Improve coordination and collaboration with freight stakeholders

Recommended Performance Measures

Performance measures are used across the transportation industry to assess how transportation systems and agencies are performing. For the Freight Plan, performance measurement can serve the following functions:

- **Plan Development** - Provide a means to quantify baseline system & potential Freight Plan recommendations and strategies
- **Plan Implementation** - Support implementation of the Freight Plan – , integrating freight performance measures into the budgeting, programming, project selection, and project implementation processes
- **Accountability** - Support accountability for the results of the Freight Plan by tracking and reporting the progress towards the Plan goals (through *Tracker* or some other process).

Figure E-3: Tracker Cover January 2014



It is worth noting again that MoDOT has a rich history in performance measurement and management. This is best exemplified by *Tracker*, the department's quarterly performance measure publication. It provides a strong foundation from which to build and many of the recommended measures that follow can be linked directly to *Tracker*.

With *Tracker* as the foundation, and through consultation with the Steering Committee, a limited number of strategic performance measures have been identified within each of the four goals. These measures are summarized in Figure E-4.

Tracker

Appendix E – Goals and Performance Measures

Figure E-4: Recommended Performance Measures

Freight Plan Goal	Recommended Measures
Maintenance Maintain the freight system in good condition	<ul style="list-style-type: none">Percent of the major highways in good condition*Percent of structurally deficient deck area on National Highway System bridges*
Safety Improve safety on the freight system	<ul style="list-style-type: none">Number of commercial vehicle crashes resulting in fatalities or serious injuries*Rail crossing crashes or fatalities*
Economy Support economic growth and competitiveness	<ul style="list-style-type: none">Goods movement competitiveness*Job and economic growth by key sector, including:<ul style="list-style-type: none">AgricultureManufacturingTransportation/Logistics
Connectivity and Mobility Improve the connectivity and mobility of the freight system	<ul style="list-style-type: none">Freight tonnage by mode*Annual hours of truck delay*Truck reliability index*

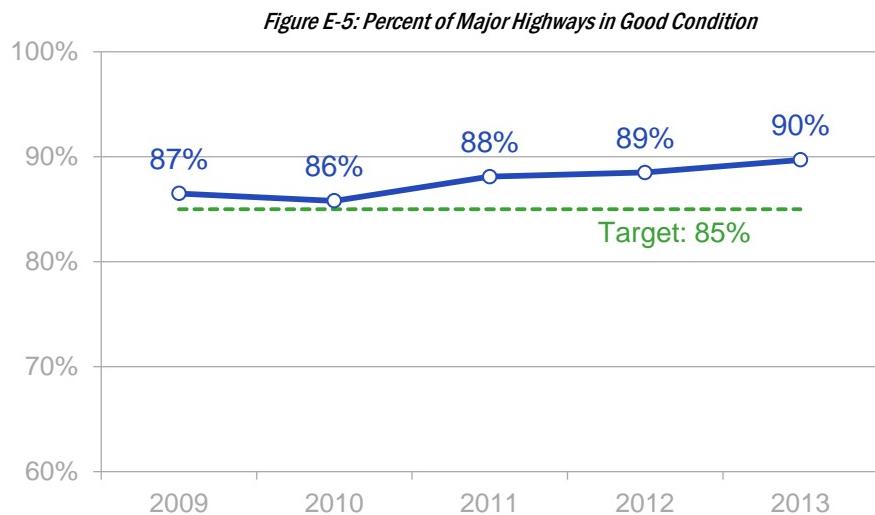
* These or similar measures have been established in MoDOT's Tracker

Appendix E – Goals and Performance Measures

Maintenance Measures

Percent of the major highways in good condition

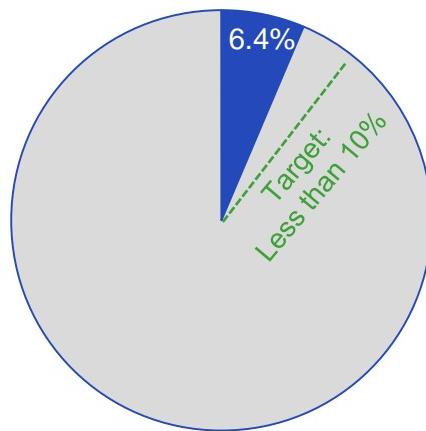
This measure tracks the conditions of Missouri's major highways system, which contains the 5,533 miles of the State's busiest highways including Interstates and most U.S. routes. It also includes busy routes in urban areas, particularly where vehicles travel between business districts and residential areas. **Figure E-5** shows the percent of Missouri's major highways that are in good condition. MoDOT has established a target of better than 85% for this measure.



Percent of structurally deficient deck area on NHS bridges

This measure tracks the percent of structurally deficient deck area for bridges that are part of the National Highway System (NHS). **Figure E-6** shows the percent of structurally deficient deck area on the National Highway System. MAP-21 requires that states track this measure with a target of fewer than 10 percent.

Figure E-6: Percent of Structurally Deficient Deck Area on the National Highway System



Appendix E – Goals and Performance Measures

Safety Measures

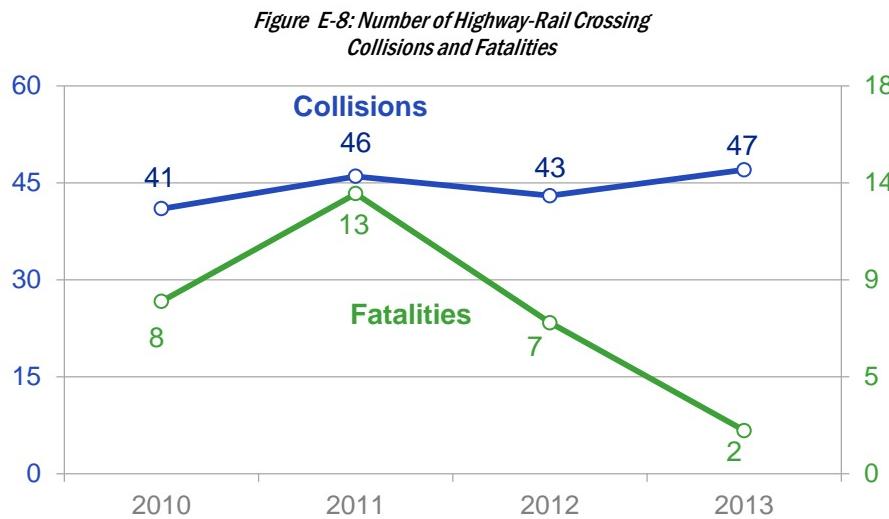
Number of commercial vehicle crashes resulting in fatalities and serious injuries

This measure, as shown in Figure E-7, tracks the number of Commercial Motor Vehicles involved in fatal and serious injury crashes each year. MoDOT uses the information to target educational, enforcement and safety improvement feature efforts.



Rail crossing crashes and fatalities

This measure, as shown in Figure E-8, tracks annual trends in fatalities and collisions resulting from train-vehicle/pedestrian crashes at public railroad crossings in Missouri. This data drives the development and focus of a portion of the Missouri Highway Safety Plan.



Appendix E – Goals and Performance Measures

Economy Measures

Goods movement competitiveness

This measure, developed specifically as a part of the Freight Plan and shown in Figures E-9, E-10, and E-11 tracks annual trends in the cost of transporting three key commodities in Missouri as compared to other Midwest states. The commodities are soybeans, crop protection, and motor vehicles. There is much more to economic competitiveness than just the costs associated with the three commodities and their specific destination and mode of travel – as such a more comprehensive look at each of can be found in Appendix B.

Figure E-9: Cost of Shipping One Ton of Soybeans from Key States to New Orleans (largely by barge), 2014



Figure E-10: Cost of Shipping One Ton of crop protection from Key States to Mexico (largely by rail), 2014



Figure E-11: Cost of Shipping One Motor Vehicle from Key States to Toronto (by truck) and Los Angeles (by rail), 2014



Appendix E – Goals and Performance Measures

Job and economic growth by key sector in Missouri

This measure was also developed specifically as a part of the Freight Plan and was done so in partnership with the Missouri Department of Economic Development. For three key transportation-reliant sectors – agriculture, manufacturing, and transportation/logistics – this measure tracks job and economic growth (GDP) growth and is shown in Figures E-12, E-13 and E-14.

Figure E-12: Jobs and Economic Growth in the Agriculture Industry in Missouri



Figure E-13: Jobs and Economic Growth in the Manufacturing Industry in Missouri



Figure E-14: Jobs and Economic Growth in the Transportation/Logistics Industry in Missouri



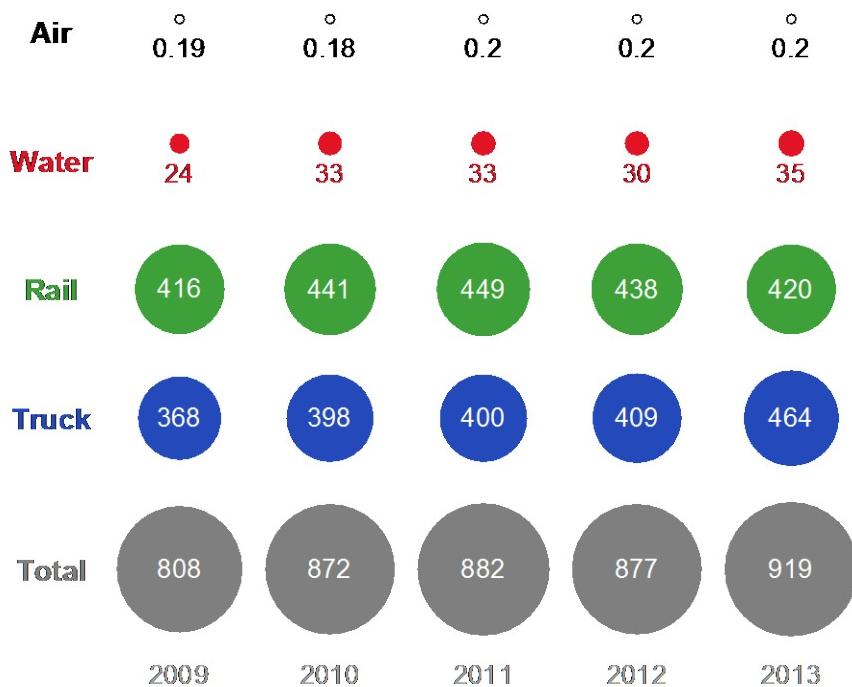
Appendix E – Goals and Performance Measures

Connectivity Measures

Freight tonnage by mode

This measure, shown in Figure E-15, tracks the amount of freight moved by Missouri's largest transportation modes. These modes experience volume shifts from year to year, often based on the health of the national economy and shifts in consumer preferences. For example, air has seen slight increases due to increases in e-commerce, water usage has increased as disruptions due to drought and flooding have been less frequent, and rail usage has declined slightly because of less coal usage in the country.

Figure E-15: Freight Tonnage by Mode (millions)



Appendix E – Goals and Performance Measures

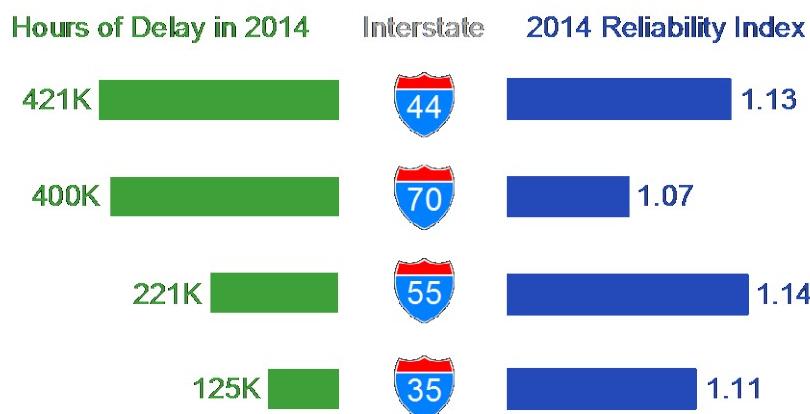
Annual hours of truck delay and truck reliability index

Annual hours of truck delay and truck reliability index are measures proposed for use in MAP-21 to measure national freight performance.

Delay is measured anytime trucks experience speeds 5 mph or more below the posted speed limited. These delays impact the cost of goods and reduce business's ability to compete on a global scale.

The Reliability Index, shown in **Figure E-16**, is a measure of how consistent truck travel times are on a corridor - the closer the index is to 1.0, the more reliable the corridor. Shippers and freight carriers require predictable travel times to control transportation costs and remain competitive.

Figure E-16: Hours of Truck Delay and Truck Reliability Index



*On the index,
a reliability of
1.0 is goal for
major
roadways.*

Integration Within the State Freight Plan

The goals and performance measures established within this document provide a foundation from which to build the Freight Plan. The following components of the plan that will be informed by these goals and measures:

- Trends and needs analysis - The data and analysis contained within these performance measures should support and enhance the baseline efforts to quantify the trends, issues and needs within the plan development.
- Scenario analysis - As the scenarios are developed and analyzed, the impact upon these performance measures will be estimated.
- Project prioritization - As projects are evaluated for their freight impacts, the performance measures can provide a baseline from which the prioritization criteria can be developed.
- Policy development - As policies and overall Freight Plan recommendations are developed, these goals and performance measures can inform their development by offering a glimpse into where and how the freight system can and should be maintained and/or improved.
- Communication efforts - Performance measures can often be useful in communicating the impact and importance of the freight system. The economic competitiveness metric could be especially useful in this area.
- Plan implementation - After the plan is completed, these performance measures can be incorporated into MoDOT's Tracker to observe how well the recommendations coming out of MoDOT Freight Plan have been implemented.

Appendix F: Scenario Planning

This technical memorandum discusses scenario planning, a visioning tool for the future of Missouri freight and freight planning.

Why scenario planning?

Before one can begin any sort of plan, a future must be defined to plan towards. Traditionally, this has meant looking at past data trends to predict the future. However, this does not work for freight plans. Unlike traditional plans, which are driven by population and job growth, statewide freight growth is largely a function of global trends which are much more volatile and unpredictable. Essentially, a decision made half-way around the world can have a dramatic effect on roadway volumes in rural Missouri.

Scenario planning is an alternative to the traditional planning method, which utilizes global trends to develop various future scenarios that allow MoDOT leaders and freight stakeholders to evaluate and plan for likely futures. Unlike the traditional quantitative methods, this process allows an open dialog that result in more informed decision-making. Namely, it allows planners including stakeholders such as modal and operational experts and public officials to discuss trade-offs, nuances and cause/effect relationships that the traditional methods would not identify. By working through the alternate futures described in each scenario, stakeholders were able to extract common needs that are likely to be relevant no matter what the future may hold.

Appendix F – Scenario Planning

Scenario Development

The project team began this process by identifying probable future trends based on lessons learned during stakeholder outreach, known industry trends and the MoDOT LRTP. **Table F-1** identifies the key trends identified that served as the framework for the development of the future scenarios.

Table F-1: Trends Driving Future Freight Movement in Missouri

Identified Trend	Description
Increase/Reduction in Global Trade	Sustained increases or reductions in global imports and exports
Alternative Fuel Trends	Increases in production and usage of alternative fuel sources
Transportation Network Conditions	Travel time and reliability is severely impeded by poor system conditions
Panama Canal Expansion	Widening of the Panama Canal could dramatically change freight flows
Science and Technology Advances	Advances in science and technology, such as advanced agricultural pesticides or machinery
Aging of the Missouri Population	Average life expectancy continues to increase
Increase in Population	Continued increases in the population of Missouri, the US and the World
High and Volatile Fuel Prices	Increase in price and volatility of all oil based fuels
Increase in Climate Regulations	Increasing air quality concerns and increasingly stringent environment regulations
Low-cost Batch Manufacturing	Widespread adoption of technologies enabling efficient and low-cost small batch manufacturing
Online Retailing	Shift towards online purchase and point of use delivery leading to reduction of physical retail stores
Re-domestication of Manufacturing	Rebound of US manufacturing jobs returning from overseas
Security Threats	Large increase in the number and magnitude of threats (domestic and abroad)
Increase/Reduction in Funding	Increases or reductions in funding for freight transportation
The "Sensible Network"	Widespread ability to capture and monetize real-time sensing data on all products, vehicles, and facilities across a supply chain at essentially no cost

Defining Future Scenarios

Consideration of the future trends and impacts, listed in **Table F-1**, led the following three future scenarios:

Hungry World

Missouri will play a major role in feeding the ever-increasing world population (35% increase by 2050). As a top 10 agricultural producer in the United States, Missouri's role in feeding the world will continue to require changes in how freight moves.

Global Market

The current global trend of re-shoring manufacturing will continue. Given Missouri's manufacturing sector's history, this would elevate Missouri's position in the global marketplace.

Convenient Living

Missourians travel and freight movements will change as people drive considerably less - seeking to work from home and live in communities where they can walk to jobs, schools, and other services - more shopping will be done online with increasing residential deliveries resulting in the decrease of traditional shopping trips.

Initial Reaction to the Scenarios

Regardless of the scenario, future supply chains will be very different than today. These changes will be visible to Missouri as distribution networks adapt and demands on the freight system shift. Scenario planning helps Missouri to be more flexible and able to adapt to capture future economic development opportunities. Each of the following impacts describes how trends and scenarios could impact the supply chain/distribution network:

Table F-2: Potential Supply Chain Changes¹

Impacts	Description
Origin (Sourcing)	Sustained increases or reductions in global imports and exports
Destination	Increases in production and usage of alternative fuel sources
Routing	Travel time and reliability is severely impeded by poor system conditions
Volume	Widening of the Panama Canal could dramatically change freight flows
Value Density	Advances in science and technology, such as advanced agricultural pesticides or machinery

A scenario planning workshop was held during the March 2014 Freight Steering Committee meeting. During the workshop, members discussed the potential scenarios and what Missouri would have to do to successfully capture the unique opportunities presented by each scenario.

To prepare for the workshop, stakeholders were provided with an overview of the scenario planning process and alternative future scenario descriptions and each participant was asked the following questions via electronic survey:

¹ "Strategic Issues Facing Transportation: Volume 1 Scenario Planning for Freight Transportation Infrastructure Investment" NCHRP 750 Report, 2013, http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_750v1.pdf

- Question 1: In the future, if agricultural demand significantly increases in Missouri due to dramatically increasing populations all over the world, which of the following two things would be most impacted?
- Question 2: In the future, if manufacturing significantly increases in Missouri due, perhaps, to rising costs overseas and if trade is more open globally, which of the following two things would be most impacted?
- Question 3: In the future, if Missourians across the state continually seek the convenience of working from home (traveling less for work during peak hours, easing congestion) and online shopping is used more and more (increasing the last mile delivery, box trucks and vans) and “livable” communities are an increasing trend in urban areas (more trips are made by walking or biking, easing roadway congestion), which of the following two things would be most impacted?

For each question, the respondents were asked to identify which of the distribution impacts, were likely to take place (see **Table F-2** for impact definitions). Results of the survey are shown in **Table F-3**. Many of the results were somewhat expected. The Hungry World scenario identified routing and volume as the largest impacts on distribution network. This is logical as Missouri imports agriculture inputs and exports the resulting product. The Global Market scenario identified impact to flow origins, volume, and routing, which would coincide with in-state manufacturing growth. Flow destinations and routing were selected for the “Convenient Living in a High Tech Missouri” scenario as freight moves away from big box retailers to more home delivery.

Table F-3: Initial Scenario Survey Results

Scenarios	Impacts						
	Flow Origins	Flow Destinations	Routing	Volume	Value Density	Not Sure	Other
Hungry World	2	1	10	12	0	0	1
Global Market	5	3	7	6	2	0	1
Convenient Living	2	10	6	3	2	0	0

Steering Committee Workshop

After presenting an overview of the scenario planning process, committee members were broken out into three groups for more in-depth discussions on the three alternative futures. The following questions were asked of each group for each scenario:

- How does this impact freight planning in Missouri?
- Will a more multimodal transportation system be needed?
- What kind of risk does this pose to Missouri’s Transportation?
- Does this future require more emphasis on preservation, modernization or expansion type projects?
- Are current funding trends adequate or require higher or less funding?

- Are policy, procedure or regulation changes necessary?
- What partnerships would help lead to success?
- Is there something that we need to include in this future that may present an impact?

Feeding a Hungry World

Participants agreed that this scenario would stress the state's transportation network and impact bridge conditions, particularly in rural areas. However, urban areas would be impacted as well. The group predicted that with continued funding limitations, solutions to these impacts would be limited.

The group identified transportation connectivity as a major limitation to the ability of Missouri to capture this opportunity. In particular, navigability of the Missouri River, farm-to-market road conditions, and the ability of the interstate system to handle the volume of agricultural products exported beyond the state's borders. Committee members also agreed a more robust multimodal transportation system would be needed to move agriculturally based freight under this scenario.

As a result, the group encouraged the state to track agricultural trends, to increase and diversify funding opportunities, and to continue relationship building with the private sector.

Changing Access to a Global Market

Under this scenario, the Missouri transportation system would be severely taxed by the dramatic increase in imports (raw materials) and exports (manufactured goods). Particularly challenging, will be the scenario's effect on suburban and urban areas where most of the state's workforce and transportation centers are located.

Committee members suggested that additional intermodal facilities would need to be built to capitalize on the existing multimodal freight system. In particular, road-to-rail connectivity is particularly important to link near-sourced Mexican suppliers to Missouri manufacturers. Additional north-south capacity (whether physical or operational) will allow better utilization of ports and rivers. However, MoDOT will have to work with USACE to continue to stress the importance of maintaining channel depth and infrastructure (locks and dams) on the Mississippi and Missouri Rivers to truly capitalize on the significant capacity available on the inland waterway system. While the steering committee identified many needs, it identified available air cargo capacity as a huge strength for Missouri under this scenario.

To appropriately prepare for a "Global Market" scenario, the committee all agreed that more funding must be provided no matter the mode, but especially for waterways, highways and rail. Without infrastructure investments, Missouri's location advantages will be meaningless. Current funding processes and incentives need to be changed in order to compete with other states.

Convenient Living in a High Tech Missouri

Committee members quickly recognized that this scenario was very different than the others. It would require a fundamental shift in not only MoDOT operations, but of most (if not all) supply chains in Missouri.

While commuter volumes would decrease, freight flows would increase. These increases would take place on local road networks that were not designed to handle the weight or the geometrics involved with a heavy volume of delivery vehicles. Additionally, this scenario significantly threatens two revenue streams: fuel and sales taxes. The fuel tax would be significantly reduced by the reduction of personal vehicle trips. A decrease in sales tax revenue would occur as more sales happen online.

On the private side, this shift could realign and require the need for additional distribution centers. Additionally, committee members suggested private industries could partner with a company/agency like the United States Postal Service to cross-dock (a logistics practice of unloading materials from an incoming truck or railroad car and loading directly into outbound trucks or rail cars, with little or no storage in between) and consolidate neighborhood deliveries. The group discussed that of all of the scenarios, partnership will be a critical aspect to the success of Missouri adapting and capturing the opportunities associated with this scenario.

Overall Recommendations

While each of the scenarios has key takeaways and lessons learned, there are several commonalities that could reasonably be expected to drive the success of the Missouri Freight System, no matter what scenario. These recommendations will provide critical inputs to the project selection and policy development sections of the *Freight on the Move* effort:

- **Proactive Partnership:** Collaboration within and between the public and private sectors will be critical.
- **Strategic Investment:** Decisions must be made in the context of supporting economic growth through emerging opportunities.
- **Flexibility:** MoDOT processes must be responsive to private sector needs.
- **State of Good Repair:** Focus on road, waterway, rail and bridge improvements.
- **Multimodalism and Connectivity:** The current highway network cannot handle future freight needs. In order to continue the state's economic prominence, new and improved intermodal connectivity points and linkages must take place.
- **Funding:** More infrastructure funding is needed and increased flexibility to allow allocation to solve complex freight challenges across modes.

APPENDIX G

Freight Project List

Appendix G: Freight Project List

As described in Chapter 8 of the Missouri State Freight Plan, The Decision-Making Process, a prioritization process is used to evaluate freight needs based on mode. Figure 8-2 depicts the freight project prioritization process. The process was modified in March 2015 to include Tiers 1-4 for highway projects to reflect the importance of agriculture to the Missouri economy and Missouri agribusiness' need for moving products from farm to market primarily on the Tier 4 system. Tables 8-1, 8-2, 8-3 and 8-4 identify the factors used in evaluation of all needs.

The fiscally constrained project list below reflects the proposed use of National Highway Freight Program (NHFP) funds distributed to Missouri by formula in the FAST Act. These projects are included in the STIP as approved by MHTC. This list will be updated annually, at a minimum, as new projects are selected for inclusion in the STIP and approved by MHTC. It should be noted that MoDOT does not fully program years 3, 4 and 5 of the STIP to retain flexibility to address emerging needs. The NHFP table below reflects that practice by not identifying funded projects in the later years. During future STIP development processes, projects from the freight unfunded list as well as newly identified projects will be evaluated for inclusion in later years.

Addendums are added annually to reflect a continuing emergence of new transportation infrastructure needs to support the movement of products into, within, and out of Missouri. Needs/projects listed are in addition to those identified in the Missouri State Freight Plan Appendix G developed in November 2017.

Appendix G: Freight Project List

Fiscally Constrained Freight Project Plan 2019 to 2024

District	County	Route	Job Number	Description	Right of Way and Construction Estimate (\$1,000)	NHFP (\$1,000)	Other Federal Funds (\$1,000)	State Road Fund (\$1,000)	State Fiscal Year
KC	Jackson	I-70	4I1597C	Interchange improvement at I-435 involving bridges A0990, A0991, A0992, and A0993	46,967	36,009	7,016	3,942	2019
SW	Newton	I-44 E	7I3357	Bridge improvements from 0.9 miles east of Loop 49 in Joplin to Route Z in Halltown. Bridges.	32,391	30,771		1,620	2019
NE	Montgomery	I-70	3I2195	Bridge improvements over Loutre River 2.2 miles west of Rte. 161 near Danville. Bridge A0971	5,006	4,471	39	497	2019
SL	St. Louis City	I-55	6I3149	Bridge improvements from Virginia Avenue to Arsenal Street. Bridges A1079, A1080, A1082, A1083, A1084, A1085, A1086	12,788	11,509	0	1,279	2020
SL	St. Louis	I-70	6I3338	Bridge improvements to ten bridges from Jennings Station Road to Coldwater Creek. Bridges A6108, A6110, A6111, A6131, A6132, A6153, A6154, A6167, A6168, A6172	5,509	4,958	0	551	2020

Fiscal Year	NHFP Available (\$1,000)	Committed NHFP (\$1,000)	NHFP to be Programmed (\$1,000)
2019	31,900	71,251	0
2020	35,400	16,467	0
2021	35,400	0	14,982
2022	35,400	0	35,400
2023	35,400	0	35,400
2024	35,400	0	35,400

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Addendum 1. Freight Projects

Weight- or width-restricted bridges create bottlenecks for efficient freight movement. The 2019-2023 STIP included rehabilitation or replacement to eliminate this roadblock for 251 bridges on the National Highway Freight Network. These projects are funded with a combination of state and federal funding. This list is in alphabetical order by county.

County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Adair	MO 11	S0568	2S0413	over Steer Creek 4.7 miles east of Rte. 63 near Kirksville.	0.052	650
Adair	MO 149	S0053	2S0416	over Shuteye Creek 3 miles south of Rte. D near Connelsville.	0.061	821
Andrew	IS 29	A1293	1I3109	over Hopkins Creek, 0.2 mile south of Rte. T near Amazonia.	0.067	5989
Andrew	IS 29	A1293	1I3109	over Hopkins Creek, 0.2 mile south of Rte. T near Amazonia.	0.067	5989
Andrew	IS 29	A1292	1I3241	on bridge over Rte. T, near Amazonia.	0.025	1180
Andrew	IS 29	A1292	1I3241	on bridge over Rte. T, near Amazonia.	0.025	1180
Andrew	MO 48	K0085	1S3133	over Agee Creek, 2 miles east of Rte. D near Whitesville.	0.1	627
Atchison	IS 29	A2369	1I3110	over the Nishnabotna River, 1 mile south of the Iowa State line.	0.25	4939

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County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Atchison	IS 29	A2369	1I3110	over the Nishnabotna River, 1 mile south of the Iowa State line.	0.25	4939
Atchison	RT U	R0475	1S3204	over Drainage Ditch, 1.3 miles south of Rte. 136 near Phelps City.	0.016	340
Audrain	US 54	G0870	2P3247	over West Fork Cuivre River 1 mile east of Rte. B near Rush Hill.	0.099	801
Audrain	RT J	A0217	2S3071	over Middle Lick Creek 1.2 miles west of Rte. 19 near Laddonia.	0.057	744
Barton	IS 49	G0577	7I3362	on the southbound bridge over the North Fork Spring River.	0.035	2321
Bates	IS 49	A1143	7I3050	on the southbound lanes over the Bates County Drainage Ditch.	0.15	3262
Bates	RT B	A3907	7P3190D	over Camp Branch 1.5 miles west of Rte. F and Panther Creek 1.3 miles west of Rte. F.	0.072	1360
Bates	RT B	A3906	7P3190D	over Camp Branch 1.5 miles west of Rte. F and Panther Creek 1.3 miles west of Rte. F.	0.072	1360
Bates	RT BB	R0025	7P3190K	over South Deepwater Branch 0.8 mile south of Rte. H.	0.125	550
Bates	RT M	A4829	7S3261	over the Osage River.	0.168	2129

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County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Benton	CST MAIN ST	N0236	7S3369	over Rte 65 in Warsaw; on Rte 82 over Hogles Creek 1.75 miles W/O Rte 83; and repair culverts on Rte H over Brickley Hollow 1.9 miles S/O Rte W and Rte MM over White Branch near Warsaw.	0.146	850
Benton	CST MAIN ST	A1832	7S3369	over Rte 65 in Warsaw; on Rte 82 over Hogles Creek 1.75 miles W/O Rte 83; and repair culverts on Rte H over Brickley Hollow 1.9 miles S/O Rte W and Rte MM over White Branch near Warsaw.	0.146	850
Benton	CST MAIN ST	P0723	7S3369	over Rte 65 in Warsaw; on Rte 82 over Hogles Creek 1.75 miles W/O Rte 83; and repair culverts on Rte H over Brickley Hollow 1.9 miles S/O Rte W and Rte MM over White Branch near Warsaw.	0.146	850
Benton	CST MAIN ST	A3020	7S3369	over Rte 65 in Warsaw; on Rte 82 over Hogles Creek 1.75 miles W/O Rte 83; and repair culverts on Rte H over Brickley Hollow 1.9 miles S/O Rte W and Rte MM over White Branch near Warsaw.	0.146	850

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County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Bollinger	MO 51	J0103	9S3298	over Castor River.	0.42	3050
Bollinger	RT P	T0394	9S3439	over Brush Creek.	0.2	718
Boone	IS 70	G0519	5I3366	over Perche Creek.	0.009	3398
Boone	IS 70	A0095	5I3366	over Perche Creek.	0.009	3398
Boone	RT HH	N0852	5S3249	over Hinkson Creek.	0.06	693
Boone	OR 70	N0974	5S3253	over Little Cedar Creek.	0.09	1093
Butler	BU 60	K0263	9S3381	over Black River.	0.102	4206
Butler	RT W	F0559	9S3386	over Black River.	0.088	3409
Butler	MO 142	S0524	9S3557	over Cane Creek.	0.02	893
Callaway	IS 70	A0096	5I3365	over Auxvasse Creek, east of Kingdom City.	0.072	2028
Callaway	RT D	A0027	5S3234	over I-70.	0.1	1694
Camden	US 54	J0832	5P3270	over the Lake of the Ozarks.	0.559	1128
Camden	RT D	A1905	5S3262	over Minnow Brook Creek.	0.055	1640
Cape Girardeau	RT A	L0567	9S3299	over Whitewater River.	0.24	1763

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County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Cape Girardeau	RT AA	P0736	9S3393	over Caney Creek.	0.2	847
Carroll	RT E	L0181	1S3207	over Turkey Creek, 0.8 mile east of Rte. D near Norborne.	0.035	866
Carroll	RT E	L0184	1S3208	over Lost Creek, 0.9 mile east of Rte. OO near Carrollton.	0.012	466
Carroll	RT V	Y0492	1S3209	on Rte. V over Miami Station Branch, near DeWitt, and on Rte. C over Turkey Creek and Branch of Turkey Creek, 1.9 miles west of Rte. F.	0.009	1240
Carroll	RT Z	T0267	2S2185	over Tater Hill Creek, 1.1 miles west of Rte. 65 near Coloma.	0.025	904
Cass	RT J	A2331	4S3286	over Young Branch, 0.1 mile south of 217th Street and 0.4 mile northeast of Branic Drive in Peculiar.	0.058	714
Chariton	US 24	G0826	1P3132	over Middle Fork Chariton River, 1.8 miles west of Rte. 129 near Salisbury.	0.12	2178
Chariton	MO 139	R0420	1S3157	over Grand River Overflow, 1.6 miles west of Rte. EE near Sumner.	0.088	2624
Chariton	US 24	G0891	2P2183	to the overflow structure of the Middle Fork Chariton River, 1.5 miles east of Rte. 129 near Salisbury.	0.065	2387

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County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Clay	CRD 128TH ST	R0476	4I3219	at 128th Street over I-70, 5.1 miles north of Rte. 291 and 3.2 miles south of Rte. 92.	0.07	784
Cole	RT H	R0250	5S3229	over Bois Brule Creek.	0.069	857
Cole	RT A	R0235	5S3334	over Moreau Creek.	0.08	777
Cooper	RT K	A1382	5S3251	over Blackwater River.	0.1	1175
Cooper	RT DD	P0227	5S3260	over Flat Creek.	0.2	1133
Crawford	MO 49	S0421	5P3241	over Dry Fork Creek.	0.046	1184
Crawford	RT CC	R0275	5S3289	over Brush Creek. Project involves bridge R0275.	0.048	859
Dade	US 160	A2931	7P2228C	over Stockton Lake.	0.101	1326
Dade	US 160	A2932	7P3195	over Stockton Lake.	0.069	1058
Dekalb	RT D	S0419	1S0588	over Ervens Branch, 0.4 mile north of Rte. W near Maysville.	0.399	754
Dekalb	RT A	A1378	1S3136	over Lost Creek, 0.5 mile south of Rte. W near Maysville.	0.13	773
Dekalb	RT A	T0641	1S3137	over North Fork Lost Creek, 1.6 miles south of Rte. Z near Maysville.	0.1	647
Dent	RT FF	P0290	5S3281	over Normal Creek.	0.02	808

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County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Dunklin	RT DD	A2382	9S3367	over St. Francis River.	0.2	942
Dunklin	RT ZZ	N0568	9S3368	over Deering Drainage Ditch.	0.2	469
Dunklin	RT DD	S0882	9S3510	over St. Francis River Slough.	0.098	784
Dunklin	MO 153	J0842	9S3517	over Taylor Slu.	0.3	275
Franklin	MO 47	A4313	6P3291	on Rte. 47 and Rte. 30 over IS 44.	0.331	4314
Franklin	MO 47	A2017	6P3291	on Rte. 47 and Rte. 30 over IS 44.	0.331	4314
Franklin	RT AD	N0620	6S3168	over Happy Sac Creek.	0.022	2721
Franklin	RT HH	R0238	6S3298	over Calvey Creek.	0.19	1347
Gasconade	RT J	X0417	5S3176	over First Creek.	0.062	1015
Gasconade	RT A	X0525	5S3242	over Third Creek.	0.044	1296
Gasconade	MO 100	A3760	5S3284	over the Gasconade River.	0.988	3512
Gasconade	MO 100	A3878	5S3284	over the Gasconade River.	0.988	3512
Gasconade	MO 100	A1411	5S3284	over the Gasconade River.	0.988	3512
Gasconade	MO 100	A4735	5S3284	over the Gasconade River.	0.988	3512

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County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Gasconade	MO 100	A2550	5S3284	over the Gasconade River.	0.988	3512
Gentry	US 169	A0729	1P3106	over Middle Fork Grand River, 0.6 mile east of Rte. YY near Gentry.	0.14	1306
Greene	MO 266	K0162	7P3190G	over Pickerel Branch 1.3 miles east of Plano.	0.037	1050
Grundy	US 65	A2570	1P3252	over Rte. 6 in Trenton.	0.025	449
Harrison	IS 35	A1896	1I3242	over Pole Cat Creek, south of Bethany.	0.052	1363
Harrison	IS 35	A1896	1I3242	over Pole Cat Creek, south of Bethany.	0.052	1363
Harrison	RT V	N0373	1S3122	over Coal Creek, 1.2 miles north of Rte. WW near Cainsville.	0.055	703
Harrison	RT P	P0576	1S3158	over White Oak Creek, 0.4 mile west of Rte. TT near McFall.	0.025	1372
Harrison	RT EE	R0075	1S3253	over Panther Creek, 0.1 mile south of Rte. F, near New Hampton.	0.02	596
Henry	MO 18	A4165	4S2276	over Grand River.	0.198	3543
Holt	IS 29	A1770	1I3099	over Kimsey Creek and Rte. E near Mound City.	0.322	4327
Holt	IS 29	A1770	1I3099	over Kimsey Creek and Rte. E near Mound City.	0.322	4327

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County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Holt	IS 29	A1771	1I3099	over Kimsey Creek and Rte. E near Mound City.	0.322	4327
Holt	IS 29	A1771	1I3099	over Kimsey Creek and Rte. E near Mound City.	0.322	4327
Holt	US 159	A2716	1P3254	over Big Lake overflow, 1 mile west of Rte. 111, near Big Lake.	0.02	354
Holt	RT B	A1834	1S3061	over I-29 near Oregon.	0.1	1064
Holt	RT T	R0223	1S3070	over Spring Creek, 0.5 mile south of Rte. O near Oregon.	0.1	378
Holt	RT T	R0224	1S3071	over Easter Creek, 0.8 mile north of Rte. U near Oregon.	0.1	394
Holt	RT H	P0997	1S3162	over Nichols Creek, 0.3 mile east of Rte. B, near Oregon.	0.021	444
Howard	RT Z	P0170	5S3238	over Bartlett Creek.	0.1	736
Howard	RT EE	A1864	5S3248	over Prairie Creek.	0.1	634
Howard	US 40	K0936	5S3330	over Katy Trail and Salt Creek.	0.147	3115
Howell	RT ZZ	N0497	9S3565	over Howell Creek.	0.024	1076
Iron	MO 72	H0393	9P3058	over Stouts Creek.	0.2	1909
Jackson	CST BLUE RIDGE BLVD	L0997	4I3024	at Blue Ridge Boulevard/US 40 in Independence.	0.078	5224

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County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Jackson	CST 140TH ST	A0119	4I3217	at 140th Street, 1.3 miles south of Main Street and 0.9 mile north of 147th Street in Grandview.	0.057	2223
Jackson	CST HILLCREST RD	A2199	4I3221	at Hillcrest Dr., 0.3 mile north of I-435 and I-470 interchange and 0.9 mile south of Blue Ridge Boulevard.	0.061	1869
Jackson	US 50	A2482	4P3009	at Chipman Road in Lee's Summit.	0.067	2377
Jackson	US 50	A3262	4P3009	at Chipman Road in Lee's Summit.	0.067	2377
Jackson	US 24	J0844	4P3015	at the Union Pacific Railroad, Drainage Ditch and Fire Prairie Creek, 0.3 mile east of Winfrey Road, 0.1 mile west of Osage Street near Buckner.	1.008	7641
Jackson	US 24	J0810	4P3015	at the Union Pacific Railroad, Drainage Ditch and Fire Prairie Creek, 0.3 mile east of Winfrey Road, 0.1 mile west of Osage Street near Buckner.	1.008	7641
Jackson	US 24	J0807	4P3015	at the Union Pacific Railroad, Drainage Ditch and Fire Prairie Creek, 0.3 mile east of Winfrey Road, 0.1 mile west of Osage Street near Buckner.	1.008	7641

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County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Jackson	US 24	J0806	4P3015	at the Union Pacific Railroad, Drainage Ditch and Fire Prairie Creek, 0.3 mile east of Winfrey Road, 0.1 mile west of Osage Street near Buckner.	1.008	7641
Jackson	CST BLUE RIDGE BLVD	L0102	4S3218	over Rte. 78, 1.1 miles east of I-435 and 0.3 mile west of Arlington Avenue.	0.067	3907
Jackson	US 24	L0840	4S3287	over Delaware Avenue/Truman Library Drive 3.6 miles east of I-435 near Independence.	0.09	2173
Jasper	IS 49	A3400	7I3254	on northbound bridge over MNA Railroad and northbound and southbound bridges over Opossum Creek.	0.08	659
Jasper	IS 49	A3403	7I3254	on northbound bridge over MNA Railroad and northbound and southbound bridges over Opossum Creek.	0.08	659
Jasper	IS 49	A3403	7I3254	on northbound bridge over MNA Railroad and northbound and southbound bridges over Opossum Creek.	0.08	659
Jasper	MO 96	H0083	7S3171	over White Oak Creek.	0.035	2147
Jasper	RT U	A1963	7S3172	over Spring River.	0.09	1990

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County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Jasper	LP 49	L0833	7S3285	on Range Line Road over KCS Railroad.	0.117	5936
Jefferson	MO 30	A2380	6S1908	on eastbound and westbound lanes over Saline Creek, at Valley Dell Drive, and Gravois Road.	0.351	4440
Jefferson	MO 30	A2380	6S1908	on eastbound and westbound lanes over Saline Creek, at Valley Dell Drive, and Gravois Road.	0.351	4440
Jefferson	MO 30	G0885	6S1908	on eastbound and westbound lanes over Saline Creek, at Valley Dell Drive, and Gravois Road.	0.351	4440
Laclede	IS 44	L0753	5I3324	over Gasconade Overflow.	0.1	2200
Laclede	MO 32	T0672	5P3332	over Mill Creek.	0.13	923
Lewis	RT C	T0808	2S3148	over Durgens Creek 1 mile west of Rte. P near LaGrange.	0.064	884
Lewis	RT K	X0192	3S2202	over Middle Fabius River 1.9 miles south of Rte. Y near Labelle.	0.053	1410

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County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Lincoln	MO 79	K0341	2P3085	over McLean's Branch 0.1 mile south of Rte. N near Winfield.	0.069	953
Lincoln	RT M	N0386	2S3005	over King's Lake 1.9 miles east of Rte. 79 near Elsberry.	0.038	772
Livingston	US 65	A1249	1P3114	over the Grand River, 1.3 miles south of Rte. 36 near Chillicothe.	0.29	4561
Livingston	MO 190	A1376	1S3156	over the Thompson River, 0.9 mile east of Rte. Y, near Chillicothe.	0.208	3419
Macon	RT D	K0516	2S2168	over BNSF Railway in La Plata.	0.201	1753
Macon	RT DD	R0049	2S3198	over Billy's Branch 0.8 mile west of Rte. K near Ten Mile.	0.057	742
Madison	RT C	J0521	9S3213	over St. Francois River.	0.2	3220
Maries	RT N	A2002	5S3282	over Rogers Creek.	0.06	526
Marion	US 61	A3152	2P3181	on northbound lane over Rte. 24 outer road 1.5 miles north of Rte. 6 at Taylor interchange.	0.11	495
Marion	US 61	A3152	2P3182	on southbound lane over Rte. 24 outer road 1.5 miles north of Rte. 6 at Taylor interchange.	0.116	481
McDonald	RT EE	H0792	7P3190F	over Indian Creek 0.4 mile south of Lanagan.	0.061	1834
Mercer	RT BB	N0855	1S3161	over Branch of Weldon Fork Creek, 3.5 miles west of Rte. 65, near Mercer.	0.02	344

Appendix G: Freight Project List

County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Mercer	RT M	T0087	1S3218	over Little Muddy Creek, 2.6 miles east of Rte. 65 near Mercer.	0.022	805
Miller	RT C	A1953	5S3263	over Deane Creek.	0.076	813
Mississippi	RT B	A0236	9S3567	over I-57.	0.403	3171
Moniteau	RT CC	A1837	5S3288	over Medlen Creek and Burris Fork Creek.	0.058	1696
Moniteau	RT CC	A1836	5S3288	over Medlen Creek and Burris Fork Creek.	0.058	1696
Monroe	US 24	A1694	2P3183	over Middle Fork Salt River 1.0 mile west of Rte. 15 near Paris.	0.095	1185
Montgomery	IS 70	L0389	2I3226	over Loutre River overflow and Loutre River 2.2 miles west of Rte. 161 near Danville.	0.76	7210
Montgomery	IS 70	L0395	2I3226	over Loutre River overflow and Loutre River 2.2 miles west of Rte. 161 near Danville.	0.76	7210
Montgomery	RT N	A0042	2S3186	over I-70 1.8 miles east of Rte. YY near Mineola.	0.065	699
Montgomery	RT P	N0352	2S3187	over Dry Fork Creek 0.7 mile south of Rte. K near Americus.	0.06	802
Montgomery	RT JJ	R0180	2S3196	over Prices Branch 1 mile west of Rte. E near Bellflower.	0.059	802
Montgomery	RT J	N0785	2S3200	over Clear Creek 2.5 miles west of Rte. 19 near Big Spring.	0.065	585

Appendix G: Freight Project List

County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Montgomery	MO 161	T0236	3S0623	over Smith Branch 3.4 miles south of Rte. 19 near Danville.	0.069	929
New Madrid	US 61	H0849	9S3327	over Drainage Ditches 37 and 18.	0.4	1368
New Madrid	US 61	H0850	9S3327	over Drainage Ditches 37 and 18.	0.4	1368
New Madrid	RT ZZ	T0785	9S3328	over Old Channel Little River.	0.2	690
New Madrid	RT W	N0415	9S3329	over Drainage Ditch 2.	0.2	545
New Madrid	RT D	L0220	9S3330	over Drainage Ditches 43 and 2.	0.4	1398
New Madrid	RT D	L0227	9S3330	over Drainage Ditches 43 and 2.	0.4	1398
New Madrid	RT H	L0619	9S3540	over Ash Slough Ditch and Drainage Ditch.	0.426	1617
New Madrid	RT H	L0620	9S3540	over Ash Slough Ditch and Drainage Ditch.	0.426	1617
New Madrid	MO 162	L0454	9S3560	over Drainage Ditches 1 and 251.	0.202	4056
New Madrid	MO 162	L0455	9S3560	over Drainage Ditches 1 and 251.	0.202	4056
New Madrid	MO 162	L0457	9S3562	over Drainage Ditch 62.	0.207	643
Newton	RT CC	Y0395	7P3190B	over Lost Creek 0.25 mile south of Racine.	0.197	553
Newton	RT E	A3306	7P3191B	over Shoal Creek 1.3 miles north of Granby.	0.263	1647

Appendix G: Freight Project List

County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Nodaway	US 136	H0512	1P3107	over Mozingo Creek, 1 mile east of Rte. F near Maryville.	0.08	791
Nodaway	US 136	H0513	1P3160	over Long Branch, 1.2 miles west of Rte. E, near Ravenwood.	0.022	1864
Nodaway	MO 46	S0920	1S0447	over Florida Creek, 0.7 mile west of Rte. AB near Maryville.	0.1	844
Nodaway	MO 46	S0922	1S0616	over White Cloud Creek, 2.3 miles east of Rte. AB near Maryville.	0.1	955
Nodaway	MO 46	S0919	1S3138	over Big Slough Creek, 0.8 mile west of Rte. AB near Maryville.	0.1	705
Nodaway	MO 46	S0921	1S3139	over stream, 3.2 miles east of Rte. AB near Maryville.	0.1	844
Nodaway	MO 46	S0918	1S3258	over the Nodaway River, 1 mile west of Rte. 113, near Skidmore.	0.04	2582
Oregon	BU 63	H0289	9S3219	over Two Mile Creek.	0.2	2311
Osage	MO 100	L0194	5S3243	over Shawnee Creek.	0.017	570
Osage	RT D	P0586	5S3250	over Mistaken Creek.	0.026	762
Osage	RT N	P0866	5S3264	over Contrary Creek.	0.161	1009
Osage	MO 100	A1822	5S3283	over Deer Creek.	0.08	993
Osage	MO 89	A1410	5S3344	over Swan Creek.	0.05	698

Appendix G: Freight Project List

County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Osage	MO 100	A1848	5S3348	over Cedar Creek.	0.03	1173
Ozark	RT J	X0768	9S3385	over Lick Creek.	0.046	1556
Pemiscot	RT CC	X0500	9S3220	over Drainage Ditch 66.	0.2	548
Pemiscot	RT A	T0696	9S3222	over Drainage Ditch 70.	0.2	467
Pemiscot	RT T	S0883	9S3227	over Main Ditch 8.	0.2	438
Pemiscot	RT EE	P0474	9S3232	over Drainage Ditches 1, 251, 258, 259 and 65.	0.553	4863
Pemiscot	RT EE	P0475	9S3232	over Drainage Ditches 1, 251, 258, 259 and 65.	0.553	4863
Pemiscot	RT EE	P0476	9S3232	over Drainage Ditches 1, 251, 258, 259 and 65.	0.553	4863
Pemiscot	RT EE	P0473	9S3232	over Drainage Ditches 1, 251, 258, 259 and 65.	0.553	4863
Pemiscot	RT A	T0698	9S3331	over Drainage Ditch 71.	0.2	424
Pemiscot	MO 153	T0910	9S3332	over Drainage Ditch 84.	0.275	857
Pemiscot	RT A	T0536	9S3530	over Drainage Ditch 72.	0.2	437
Pettis	RT O	X0861	3S3090	over Muddy Creek, 2.7 miles north of Lee Road and 1.8 miles south of Lookout Road.	0.109	1185

Appendix G: Freight Project List

County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Pettis	RT D	S0828	3S3115	at Heaths Creek on Rte. D, 0.9 mile west of McCubbin Road and 0.8 mile east of McAninch Road.	0.15	758
Pettis	RT D	S0827	3S3116	at South Fork Blackwater River, 0.7 mile east of Rte. 127 and 2.4 miles west of Gibson Road.	0.15	1236
Phelps	RT U	A1869	5S3349	over I-44.	0.14	1015
Phelps	RT B	S0634	5S3350	over Clear Creek.	0.04	1079
Pike	RT U	R0059	2S3120	over Peno Creek 1.0 mile west of Rte. 61 near Bowling Green.	0.092	785
Pike	RT U	H0231	2S3177	over Branch Peno Creek 0.2 mile west of Rte. 61 near Bowling Green.	0.059	873
Pike	RT C	T0881	3S2219	over Crooked Branch 2.4 miles west of Rte. E near Frankford.	0.063	821
Platte	MO 273	A0108	4I3197	over I-29, in Tracy.	0.231	5986
Platte	IS 29	A1669	4I3291	over 56th Street, 1.8 miles west of Rte. 169 near Riverside.	0.035	3898
Platte	IS 29	A1669	4I3291	over 56th Street, 1.8 miles west of Rte. 169 near Riverside.	0.035	3898
Platte	IS 29	L0690	4I3297	over Rte. AA, 0.8 mile west of Rte. 169 near Northmoor.	0.056	5180

Appendix G: Freight Project List

County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Platte	RT FF	A0533	4S3290	2.1 miles west of Rte. 9 in Parkville and 0.1 mile east of Union Chapel Road.	0.019	794
Polk	MO 123	L0198	7S3205	over Barren Creek 1.25 miles south of Fair Play.	0.027	981
Putnam	RT Y	P0834	1S3163	over North Blackbird Creek, 2.6 miles south of Rte. 129 near Unionville.	0.007	301
Ralls	US 61	A1060	2P3137	over Norfolk Southern Railway 0.9 mile north of Rte. HH in Hannibal.	0.089	1433
Ralls	US 61	A1061	2P3138	over Bear Creek 0.6 mile north of Rte. HH in Hannibal.	0.076	1197
Ralls	RT H	R0434	2S3046	over Salt River 1.2 miles north of Rte. A near Center.	0.15	1508
Ray	RT J	A2688	3S3089	at Crooked River, 0.9 mile west of 80th Street and 1.1 miles east of Shotwell Road.	0.11	784
Reynolds	RT K	T1000	9S3561	over Black River.	0.11	2464
Ripley	MO 142	L0378	9S3209	over Little Black River.	0.2	895
Saline	MO 41	H0920	3P3092	at Muddy Creek. 0.3 mile south of 330th Road and 0.8 mile north of 320th Road.	0.151	1159
Saline	MO 41	A2875	3P3093	over Rte. O and railroad.	0.1	1614

Appendix G: Freight Project List

County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Saline	MO 41	J0120	3P3125	over Flat Creek, 3.2 miles east of Rte. E and 1.8 miles west of Rte. D near Marshall.	0.3	1100
Saline	MO 41	J0041	3P3126	over Camp Creek, 1.5 miles east of Rte. E near Marshall and 0.2 mile west of Nocturne Avenue.	0.15	833
Saline	MO 122	T0576	3S3091	at Muddy Creek, 0.5 mile east of 305th Road and 0.1 mile west of Harvest Avenue.	0.171	1492
Saline	RT YY	A0129	3S3127	over I-70, 3.6 miles west of Rte. 65 and 3.2 miles east of Rte. K.	0.124	2517
Scotland	MO 15	H0857	2P3089	over South Wyaconda River 0.1 mile south of Rte. BB near Memphis.	0.076	1149
Scott	US 61	J0356	9S3063	over the Union Pacific Railroad and Rte. M.	0.2	2738
Scott	MO 91	S0665	9S3278	over Drainage Ditch 291.	0.11	573
Scott	MO 91	S0744	9S3279	over Drainage Ditch 35.	0.12	615
Scott	RT ZZ	L0271	9S3395	over Drainage Ditch 4.	0.2	721
St. Clair	RT C	A3791	7S3202	over Truman Lake.	0.364	2590
St. Clair	RT ZZ	A3882	7S3203	over Truman Lake.	0.337	1140

Appendix G: Freight Project List

County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
St. Francois	US 67	A0654	9P3382	over Rte. 8 near Desloge.	0.426	991
St. Francois	US 67	L0666	9P3547	over Union Pacific Railroad.	0.072	233
St. Francois	RT NN	L0329	9S3566	over Indian Creek.	0.021	779
St. Louis	MO 141	A8124	6P3062B	over flood control lake in Earth City.	0.117	332
St. Louis	MO 141	A8123	6P3062B	over flood control lake in Earth City.	0.117	332
St. Louis	RT AB	W0332	6S2211	on Ladue Road (Rte. AB) at Hibler Creek in Creve Coeur.	0.101	1216
St. Louis	CST MIDLAND BLVD	A3602	6S3404	on Midland Boulevard and on Lackland Road over I-170.	0.07	6265
St. Louis	CST MIDLAND BLVD	A3173	6S3404	on Midland Boulevard and on Lackland Road over I-170.	0.07	6265
St. Louis City	CST BROADWAY	A0134	6S3272	over I-70.	0.227	7068
St. Louis City	CST BROADWAY	A0134	6S3272	over I-70.	0.227	7068
Stoddard	RT Z	N0287	9S3224	over Drainage Ditch 4, Main Drainage Ditch, Little River Drainage Ditches and Drainage Ditch 7.	0.97	2821
Stoddard	RT Z	P0443	9S3224	over Drainage Ditch 4, Main Drainage Ditch, Little River Drainage Ditches and Drainage Ditch 7.	0.97	2821

Appendix G: Freight Project List

County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Stoddard	RT Z	N0285	9S3224	over Drainage Ditch 4, Main Drainage Ditch, Little River Drainage Ditches and Drainage Ditch 7.	0.97	2821
Stoddard	RT Z	N0286	9S3224	over Drainage Ditch 4, Main Drainage Ditch, Little River Drainage Ditches and Drainage Ditch 7.	0.97	2821
Stoddard	MO 91	S0769	9S3263	over Drainage Ditch 33.	0.11	593
Stoddard	MO 91	S0770	9S3264	over Drainage Ditch 34.	0.11	579
Stoddard	RT WW	N0433	9S3396	over Drainage Ditch 26.	0.051	656
Stone	MO 265	T1016	7P3190I	on private drive over Pine Run Creek 0.1 mile south of Rte. AA.	0.022	145
Sullivan	RT PP	P0956	1S3140	over East Medicine Creek Drainage Ditch, 0.2 mile east of Rte. 139 near Osgood.	0.12	1389
Taney	US 65	A3070	7P3190L	over southbound Lake Taneycomo between Branson and Hollister.	0.14	2225
Texas	MO 17	J0617	9P3212	over Big Creek.	0.2	2097
Vernon	IS 49	A1343	7I3363	on southbound bridge over Missouri and North Arkansas Railroad.	0.043	2308

Appendix G: Freight Project List

County	Route	Bridge Number	Job Number	Location	Length	Total Programmed (thousands \$)
Vernon	US 54	A1064	7P3174	over Missouri and Northern Arkansas Railroad.	0.288	4839
Vernon	RT FF	A2015	7P3190C	over Drywood Creek 2.2 miles west of Rte. F.	0.099	1400
Vernon	RT K	N0467	7P3190H	over Camp Branch 2.6 miles east of Bristow.	0.2	901
Vernon	RT BB	R0100	7P3190J	over Moore Branch 3.5 miles south of Nevada.	0.137	1007
Washington	RT AA	N0767	5S3240	over Fourche-A-Renault.	0.049	1416
Wayne	MO 34	J0935	9P3218	over Black River.	0.21	7013
Wayne	MO 34	F0111	9P3380	over St. Francis River.	0.207	1822
Wayne	RT A	S0498	9S3383	over Small Creek.	0.017	907
Wayne	RT FF	N0205	9S3568	over Rings Creek.	0.028	998
Worth	RT YY	H0617	1S3134	over the Middle Fork Grand River, 0.5 mile north of Rte. W near Gentry.	0.14	2256
Wright	MO 38	S0099	9S3384	over Evening Shade Creek.	0.2	997

Appendix G: Freight Project List

Unfunded Freight Needs – Projects Identified in SFP Development

CENTRAL DISTRICT PROJECT LIST

District	Type	Route	Project Description	Cost Information (Millions)	County
CD	Highway	50/63	Improve US-50/63 in Jefferson City (Whitton Expressway) from Clark Avenue to Missouri Boulevard	\$50 - \$75	Cole
CD	Highway	70	Improve the I-70 / US-63 interchange in Columbia	\$25 - \$50	Boone
CD	Highway	50	Complete US-50 as a four-lane highway from Sedalia to California	\$120 - \$140	Pettis, Morgan, Moniteau

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
CD	Rail	Rail	Construct the Hermann universal crossover to improve the MO River Runner train service	\$3 - \$4	Gasconade
CD	Rail	Rail	Construct the Bonnotts Mill universal crossover to improve the MO River Runner train service	\$4 - \$5	Osage
CD	Highway	50/63	Expand US-50/63 in Jefferson City to six lanes from Broadway Street to Eastland Drive	\$75 - \$100	Cole

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
CD	Rail	Rail	Construct third mainline rail track in Cole County (Jefferson City) to better accommodate the MO River Runner trains	\$4 - \$5	Cole
CD	Highway	54	Improve the Summit Drive/US-54 interchange in Holts Summit by adding two ramps to the north	\$2 - \$2.5	Callaway
CD	Highway	63	Construct US-63 alternate route around Rolla	\$25 - \$50	Phelps

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
CD	Highway	54/70	Install truck stop/rest area in Kingdom City nearest fuel access in Callaway County	\$10 - \$15	Callaway
CD	Waterways	Waterways	New dock and road at Howard/Cooper Port	\$.75 - \$1	Howard
CD	Highway	44	Improve vertical clearance under the BNSF Bridge on I-44 east of Phillipsburg	\$3 - \$5	Laclede
CD	Highway	54	Missouri River Bridge to US-63 E. and W./ MO-94 in Jefferson City	\$1.3 - \$1.5	Cole, Callaway
CD	Highway	70	Build bypass of I-70 around Columbia	\$350 - \$400	Boone

Appendix G: Freight Project List

KANSAS CITY DISTRICT

District	Type	Route	Project Description	Cost Information (Millions)	County
KC	Highway	35	I-35 Interchange at US-169 (Northwest Downtown Loop) – Reconstruction	\$70 - \$75	Jackson
KC	Highway	35, 70, 670, 71	Downtown Loop Improvements in Kansas City (I-35, I-670 and US-71)	\$75 - \$100	Jackson
KC	Rail	Rail	Improve the KC Terminal Railroad's overpass on Independence Ave.	\$25 - \$30	Jackson
KC	Highway	49	Corridor improvements, including adding lanes from 155th St. to North Cass Pkwy to address mobility and safety	\$20 - \$25	Cass

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
KC	Highway	71	Corridor improvements along Bruce R. Watkins Dr. from 55th Street to Bannister Rd. to address safety	\$60 - \$80	Jackson
KC	Rail	Rail	Construct double track from Lee's Summit to Strasburg to better accommodate MO River Runner trains	\$45 - \$50	Jackson, Cass
KC	Highway	70	Interchange improvements at I-435 to address mobility, safety and bridge conditions	\$40 - \$45	Jackson
KC	Highway	35	Interchange improvements at MO-152 in Liberty	\$10 - \$15	Clay

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
KC	Highway	70	Corridor and interchange improvements from I-435 to I-470 to address mobility and safety	\$200 - \$225	Jackson
KC	Highway	70	Corridor improvements, including adding lanes from Blue Springs (MO-7) to just east of Oak Grove (MO-F) to address mobility and safety	\$40 - \$45	Jackson
KC	Waterways	Waterways	Rail connection and repair at Kansas City Port	\$3.9 - \$4.2	Jackson

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
KC	Rail	Rail	Construct Kingsville siding to better accommodate MO River Runner trains	\$15 - \$16	Johnson
KC	Rail	Rail	Construct Knob Noster siding extension to better accommodate MO River Runner trains	\$15 - \$16	Johnson
KC	Aviation	Aviation	Relocate POST 28 access gate and add new security structure, gate and pavement	\$2.50	Platte
KC	Aviation	Aviation	Perimeter fence and gates around AOA to meet new standards	\$6	Platte

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
KC	Highway	49/7	Improve the I-49 and MO-7 interchange	\$10 - \$15	Cass
KC	Rail	Rail	KCT Realign, raise and add a third track in north/south corridor	\$23	Jackson
KC	Highway	13	Corridor improvements from I-70 to MO-V/OO (Warrensburg east loop)	\$55 - \$60	Lafayette, Johnson
KC	Highway	29	Operational improvements from north of I-635 to MO-210 in North Kansas City	\$40 - \$45	Clay, Platte

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
KC	Highway	70	Interchange improvements in Odessa	\$10 - \$15	Lafayette
KC	Waterways	Waterways	Acquire container loading equipment at Kansas City Port	\$1.1 - \$1.3	Jackson
KC	Highway	24	Replace the US-24 Bridge over RR west of I-435	\$20 - \$25	Jackson

Appendix G: Freight Project List

NORTHEAST DISTRICT PROJECT LIST

District	Type	Route	Project Description	Cost Information (Millions)	County
NE	Highway	54	Upgrade US-54 from Mexico to Louisiana with new four-lane roadway	\$145 - \$155	Audrain, Pike
NE	Waterways	Waterways	Terminal improvements - B at Lewis Canton Port	\$.06 - \$.1	Lewis
NE	Waterways	Waterways	Roadway improvements at Lewis Canton Port	\$.35 - \$.4	Lewis

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
NE	Highway	70	Straighten I-70 at the rail overpass between High Hill and Jonesburg	\$13 - \$14	Warren
NE	Highway	63	Corridor improvements (including lanes) from Kirksville to Iowa state line	\$60 - \$70	Adair, Schuyler
NE	Highway	70	Improve the overpass access to the Truxton truck stop	\$5-\$10	Montgomery
NE	Highway	61	Alternate roadway west of Hannibal (Hannibal Expressway)	\$60 - \$65	Marion

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
NE	Highway	70	Construct a new interchange in Warrenton west of MO-MM (or at existing Stracks Church Rd.) to reduce existing traffic on MO-47 and bring more economic development to the area	\$10 - \$15	Warren
NE	Highway	70/47	Construct a new interchange at I-70 and MO-47 in Warrenton	\$14 - \$16	Warren
NE	Highway	63	Four-lane the alternate route around Kirksville in Adair County	\$25 - \$30	Adair

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
NE	Highway	63	Construct an interchange at US-63 and MO-11 intersection near Kirksville in Adair County	\$6 - \$8	Adair

Appendix G: Freight Project List

NORTHWEST DISTRICT PROJECT LIST

District	Type	Route	Project Description	Cost Information (Millions)	County
NW	Highway	65	Shared four-lane roadway from north of Marshall to Chillicothe	\$65 - \$75	Saline, Lafayette, Carroll, Livingston
NW	Highway	229/59	Reconstruct the I-229/US-59 interchange in St. Joseph	\$20 - \$25	Buchanan
NW	Highway	36	Interchange improvements at US-36 and Riverside Rd.	\$6 - \$9	Dekalb

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
NW	Highway	29	Construct a diverging diamond interchange at I-29 and Frederick	\$12 - \$15	Buchanan
NW	Highway	35	Interchange improvements at I-35 and US-36 in Cameron ranging from improving the bridge to reconstructing entire interchange	\$2.5 - \$45	Dekalb
NW	Highway	229/A	Construct ramps on east side of existing interchange to accommodate all traffic movements	\$6 - \$8	Buchanan
NW	Highway	71	Four-lane US-71 from Maryville to Iowa	\$65 - \$80	Nodaway

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
NW	Highway	35	Improve I-35 from Cameron to Lathrop	\$10 - \$12	Clinton
NW	Waterways	Waterways	Additional liquid storage tanks (estimated at 5) at St. Joseph Port	\$4.5 - \$5	Buchanan
NW	Waterways	Waterways	Bio Diesel Liquid Storage - Tanks and Transfer Station at St. Joseph Port	\$2.5 - \$3	Buchanan

Appendix G: Freight Project List

SOUTHEAST DISTRICT PROJECT LIST

District	Type	Route	Project Description	Cost Information (Millions)	County
SE	Rail	Rail	Construct New Bourbon Port connection from the port to I-55 and a rail connection to St. Francois County (Unknown cost for rail connection)	\$25 - \$27	Ste. Genevieve
SE	Waterways	Waterways	Construct RR Wye between PCPA RR & BNSF at Pemiscot County Port	\$2.4 - \$2.6	Pemiscot
SE	Highway	55	Raise grade of interstate for 2 miles at St. John's Bayou	\$8 - \$10	New Madrid

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
SE	Waterways	Waterways	North tracks 4, 5, & 6 at SEMO Port	\$5 - \$6	Scott
SE	Waterways	Waterways	Bridge Upgrades at SEMO Port	\$4 - \$5	Scott
SE	Waterways	Waterways	Elevate sections of road into port and pave entire road (two-phases) at New Bourbon Port	\$1.6 - \$1.8	Ste. Genevieve
SE	Waterways	Waterways	Extension of RR Mainline in Industrial Park #1 at Pemiscot County Port	\$3 - \$4	Pemiscot

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
SE	Highway	SR84/I55	Roadway from MO-84 to I-55 from Pemiscot County Port to provide additional capacity	\$3.5 - \$5	Pemiscot
SE	Highway	55	Reconstructed interchange, leads to major Illinois bridge I-55/Exit 93 South Kings Highway/I-55/MO- 74	\$10 - \$15	Cape Girardeau
SE	Highway	55	Corridor and overpass improvements into St. Jude's industrial park	\$4 - \$6	New Madrid
SE	Highway	67	Corridor improvements including 4-laning from south of MO-160 to the Arkansas state line	\$35 - \$40	Butler

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
SE	Waterways	Waterways	Grain 2 & 3 Tracks and Tail Track 2 at SEMO Port	\$.9 - \$.1	Scott
SE	Water ways	Waterways	Missouri Landing Improvements at Mississippi County Port	\$.05 - \$1	Mississippi
SE	Water ways	Waterways	Construct two drive over hoppers at New Bourbon Port	\$.2 - \$.3	Ste. Genevieve
SE	Water ways	Waterways	Dock Rail Spurs at SEMO Port	\$.35 - \$.4	Scott

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
SE	Waterways	Waterways	Loop Tracks Fill Project - Phase 2 Fill at SEMO Port	\$4 - \$5	Scott
SE	Rail	Rail	Construct Stoddard County Industrial Park Spur	\$1 - \$2	Stoddard
SE	Waterways	Waterways	Construction of two coffer cells at New Bourbon Port	\$6 - \$7	Ste. Genevieve
SE	Waterways	Waterways	Dolphins - Harbor North Side at SEMO Port	\$5 - \$6	Scott

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
SE	Waterways	Waterways	Dry Bulk Warehouse at SEMO Port	\$.9 - \$1	Scott
SE	Highway	55/57/60	Construct a new interchange at I-55, I-57 and US-60	\$20 - \$25	New Madrid
SE	Waterways	Waterways	Warehouse Construction at New Madrid Port	\$1.2 - \$1.3	New Madrid
SE	Highway	55	Interchange and outer road to US-61	\$8 - \$10	Cape Girardeau
SE	Rail	Rail	Construct Lilbourn Industrial Park Spur	\$1 - \$2	New Madrid
SE	Waterways	Waterways	Land Purchase at New Madrid Port	\$3.1 - \$3.5	New Madrid
SE	Waterways	Waterways	Purchase Land for Industrial Park #2 at Pemiscot County Port	\$1.7 - \$1.9	Pemiscot

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ST. LOUIS DISTRICT PROJECT LIST

District	Type	Route	Project Description	Cost Information (Millions)	County
SL	Highway	64	Capacity Improvements from I-70 to MO-K	\$30 - \$35	St. Charles
SL	Highway	64	Reconstruct the 6th St. ramp and add an I-64 through lane	\$24 - \$28	City of St. Louis

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SL	Highway	64	Interchange improvements at Jefferson (full interchange)	\$10 - \$12	City of St. Louis
District	Type	Route	Project Description	Cost Information (Millions)	County
SL	Highway	70	Corridor improvements on I-70 from I-64 to the Missouri River (near MO-94)	\$100 - \$130	
SL	Highway	44/55	Upgrade entrance and exit ramps at Gravois and Tucker (12th St.) in St. Louis City	\$10 - \$12	City of St. Louis
SL	Highway	44/55	Improve I-44 and I-55 Interchange with a new lane from I-44 west to I-55 south	\$75 - \$80	City of St. Louis

Appendix G: Freight Project List

SL	Rail	Rail	Improve Merchants Rail Bridge	\$150-\$180	City of St. Louis
District	Type	Route	Project Description	Cost Information (Millions)	County
SL	Highway	70	Reconstruct the I-64/I-70/US 61 interchange and add capacity from Wentzville Parkway to I-64 in St. Charles	\$80 - \$100	Warren, St. Charles
SL	Highway	61	Corridor improvements on US-61 from Lincoln Co. to I-70	\$15 - \$20	St. Charles
SL	Highway	67	Corridor improvements from Page Ave. to I-70	\$5 - \$8	St. Louis County

Appendix G: Freight Project List

SL	Highway	270	Interchange improvements at MO-180 (St. Charles Rock Road)	\$10 - \$12	St. Charles
District	Type	Route	Project Description	Cost Information (Millions)	County
SL	Rail	Rail	Construct new track from N. Market to Biddle St. to better accommodate MO River Runner trains	\$6 - \$7	City of St. Louis
SL	Aviation	Aviation	Connect Lambert International Airport cargo area with an industrial complex and connections to I-70	\$10 - \$15	St. Louis
SL	Highway	70	Interchange improvements at I-270	\$25 - \$30	St. Louis

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SL	Highway	64/270	Rebuild the I-64/I-270 interchange to alleviate congestion	\$60 - \$80	St. Louis
District	Type	Route	Project Description	Cost Information (Millions)	County
SL	Highway	55	Interchange and corridor improvements on I-55 from MO-Z (Pevely) to US-67, including the I-55/US-67 interchange	\$150-\$200	Jefferson
SL	Waterways	Waterways	Municipal River Terminal, N Dock, Sheet Steel Dock Piling Repairs at St. Louis City Port	\$.5 - \$.6	City of St. Louis
SL	Waterways	Waterways	Municipal River Terminal, N Dock, Piling Anchor Tie Head Assemblies and Plate Repairs at St. Louis City Port	\$.1 - \$.15	City of St. Louis

Appendix G: Freight Project List

SL forum	Aviation	Aviation	Air cargo capacity is available but the cargo facilities are dated, small, no refrigeration.	Unknown	St. Louis
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District	Type	Route	Project Description	Cost Information (Millions)	County
SL	Aviation	Aviation	Improvements at Lambert Airport including expanding the cargo facility to the north side of the airport and redeveloping the former Boeing production facility for cargo development and expansion	\$3.10	St. Louis
SL	Rail	Merchant's Bridge	Increase Merchant Bridge capacity; provide state of good repair	250	St. Louis City

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STATEWIDE PROJECT LIST

District	Type	Route	Project Description	Cost Information (Millions)	County
Statewide	Highway	I-70	Improve I-70 between Kansas City and St. Louis (Ranges from adding a third lane to dedicated truck lanes)	\$2,000 - \$4,000	
Statewide	Highway	I-70	Improve I-70 between Kansas and I-470	Unknown	
Statewide	Highway	I-70	Improve I-70 between Lake St. Louis and I-55/64	Unknown	

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Statewide	Highway	I-44	Improve I-44 between St. Louis and the Oklahoma state line (Ranges from adding a third lane to dedicated truck lanes)	\$2,000 - \$2,500
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SOUTHWEST DISTRICT PROJECT LIST

District	Type	Route	Project Description	Cost Information (Millions)	County
SW	Rail	Rail	BNSF Springfield rail terminal and improved intermodal connections. Known as West Wye Rail Project	\$3.10	Greene
SW	Highway	49	Interchange improvements at I-49/MO-171 in the Carthage area and designate MO-249 as an interstate.	\$40 - \$80	Jasper
SW	Highway	13	Add lanes to MO-13 from Clinton to Warrensburg	\$35 - \$45	Henry, Johnson

Appendix G: Freight Project List

District	Type	Route	Project Description	Cost Information (Millions)	County
SW	Highway	65	Capacity improvements from US-60 in Springfield to MO-F in Ozark	\$45 - \$60	Greene, Christian
SW	Highway	44	Interchange ramp improvements at MO-38 in Marshfield.	\$5 - \$.8	Webster
SW	Highway	44	Interchange improvements at I-44 and MO-125 in Strafford	\$2 - \$4	Greene
SW	Highway	44	Interchange improvements at I-49 in Fidelity.	\$25 - \$35	Newton

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District	Type	Route	Project Description	Cost Information (Millions)	County
SW	Highway	65	Interchange improvements at Main St. in Warsaw	\$5 - \$6	Benton
SW	Highway	49	Construct Bella Vista Bypass	\$50 - \$55	McDonald
SW	Highway	65	Intermittent passing lanes and turn lanes between Preston and Buffalo	\$10 - \$20	Dallas, Hickory
SW KBRPC	Highway	54	Roadway improvements to accommodate trucks, including truck parking in Wheatland	Unknown	Hickory

Appendix G: Freight Project List

Unfunded Freight Needs – Projects Identified after 2015 SFP Completion

District	County	Route	Description	Cost Estimate (\$1,000)	Job Number	Program SFY
NW	Chariton	PORT	Increase capacity for storage and transloading of ag products	1,100		
CD	Boone	COLT RR	Increase rail gauge to allow for heavier loads	700		
CD	Boone	COLT RR	Expand transload facility to accommodate increased capacity	1,250		St
SL	St. Louis City	Lambert International Airport	Increase strength of pavement in cargo area to accommodate cargo planes.	5,000		
Statewide	Various	Shortline RR	Increase ability of shortline RR to provide freight connection between customers and Class 1 RR			
SL	St. Louis City	44	Remove restrictions on bridge at the 3rd Street Viaduct. Project involves bridges Lo361, A3162, A3351, A3352 and A3353.	22,804	612332	2018
SW	Jasper	49	Remove restrictions on bridges A3556 and A3557 over the BNSF Railroad and Spring River.	4,288	7P3000	2018
SW	Lawrence	39	Separate truck and rail traffic Rail on Carnation Drive at BNSF Railway and on Rte. K (Elliot Street) at the BNSF and MNA Railways in Aurora. Close at-grade crossings on Morgan Avenue.	4,648	7T0043	2018
CD	Howard Cooper	Port	Development of Port/ Stage One	1,230		
CD	Howard Cooper	Port	Development of Port	562		
CD	Howard Cooper	Port	Development of port	389		
CD	Howard Cooper	Port	New port site -- dredge, fill, grain bins, dry fertilizer storage and crane; wing dam relocation	2,263		

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District	County	Route	Description	Cost Estimate (\$1,000)	Job Number	Program SFY
KC	Port KC	Port	Removal of wooden trestle/ replace with dock structure	8,000		
KC	Port KC	Port	Improvement to existing brick warehouse/demolition of pole	1,500		
KC	Port KC	Port	Barge Winch System	900		
KC	Port KC	Port	Repairs to office/dockside repairs/paving damaged storage areas	900		
KC	Port KC	Port	Barge loading/unloading equipment	542		
KC	Port KC	Port	Terminal Paving and Storm Water Improvements	400		
KC	Port KC	Port	Warehouse demolition, grading, utilities	296		
NE	Lewis County	Port	Extension of Marion St/Flood Gate/RR Crossing	1,750		
NE	Lewis County	Port	Grade Improvements and concrete landing areas and roadway	1,250		
NE	Lewis County	Port	Sheet Wall extension of 400'	1,200		
NE	Lewis County	Port	Staging area warehouse	800		
NE	Lewis County	Port	Conveyor system	750		
NE	Pike/Lincoln	Port	Land Purchase	2,000		
NE	Pike/Lincoln	Port	Warehouse	1,138		
NE	Pike/Lincoln	Port	Engineering/dock and rail improvements	1,024		
NE	Pike/Lincoln	Port	Construction of dry bulk storage	880		
NE	Pike/Lincoln	Port	Engineering/Land Improvement	800		
NE	Pike/Lincoln	Port	Engineering/Road Improvements	388		
NW	St. Joseph	Port	Hoop Barn Building Conveyor System	1,500		
NW	St. Joseph	Port	Conveyor System #1	1,312		
NW	St. Joseph	Port	Excavator with hydraulic clamshell	680		
NW	St. Joseph	Port	Front loader	240		
NW	St. Joseph	Port	Land acquisition	235		

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District	County	Route	Description	Cost Estimate (\$1,000)	Job Number	Program SFY
NW	St. Joseph	Port	Conveyor System #2	208		
SE	Mississippi County	Port	Replace tug for ferry	600		
SE	Mississippi County	Port	Dorena II Improvements	236		
SE	Mississippi County	Port	Hickman II Dry Dock	160		
SE	Mississippi County	Port	Missouri Landing Improvements for Ferry Boat	120		
SE	Mississippi County	Port	Skid Steer Loader and Shed	32		
SE	Mississippi County	Port	Annual on-going maintenance for ferry boat and barge	25		
SE	New Bourbon	Port	Construct rail siding to dock area	11,200		
SE	New Bourbon	Port	Dock Areas Improvements -- including conveyor system	2,043		
SE	New Bourbon	Port	Install port infrastructure	1,481		
SE	New Bourbon	Port	Road and BNSF Rail crossing	1,310		
SE	New Bourbon	Port	Annual on-going maintenance for ferry boat and barge	25		
SE	New Madrid	Port	Land Purchases/Improvements	8,000		
SE	New Madrid	Port	Phase I Improvements & Land Purchase	2,500		
SE	New Madrid	Port	Land Acquisition	1,520		
SE	New Madrid	Port	Road/platform for conveyor/crane system	136		
SE	Pemiscot County	Port	Harbor widening	4,150		
SE	Pemiscot County	Port	Railroad loop track construction	2,300		

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District	County	Route	Description	Cost Estimate (\$1,000)	Job Number	Program SFY
SE	Pemiscot County	Port	Port Office on site	150		
SE	SEMO	Port	Loop Track	11,000		
SE	SEMO	Port	Harbor Lead Track #2	1,194		
SE	SEMO	Port	North and West Tracks	415		
SE	SEMO	Port	Main Track Raise	296		
SL	Jefferson County	Port	Multimodal freight port - property acquisition and development of rail	10,500		
SL	Jefferson County	Port	Property acquisition	2,000		
SL	Jefferson County	Port	Fleeting Construction	760		
SL	St. Louis City	Port	Municipal River Terminal -- Branch Street, rail spur, warehouse	8,754		
SL	St. Louis City	Port	South Riverfront site prep	1,600		
SL	St. Louis City	Port	Warehouse flood protection	630		
SL	St. Louis City	Port	Upgrade North Rail Yard	450		
SL	St. Louis City	Port	Upgrade Yard	400		
SL	St. Louis City	Port	Rail Gate Improvements	400		
SL	St. Louis County	Port	Explore building ports in South and North County areas	5,000		
CD	Boone	FRE	Provide casks for transporting radio isotope	560		
SL	St. Louis	I-270	Modernization of I-270 north including capacity and interchange reconfigurations	500,000		
Statewide	Statewide	I-70	Incident Management package for rural 70—including additional DMS, emergency vehicle crossovers, slip ramps	36,608		
Statewide	Statewide	I-44	Incident Management package for rural 44—including additional DMS, emergency vehicle crossovers, slip ramps	4,093		

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District	County	Route	Description	Cost Estimate (\$1,000)	Job Number	Program SFY
NE	Montgomery	I-70	Eliminate curve at High Hill Railroad bridge and increase vertical clearance	19,000		
SL NE	St. Charles Warren	I-70	Add capacity between Wentzville and Warrenton	150,000		
SW	Greene	I-44	Replace ramp at Route 65 with flyover to increase speed	25,000		
NE	Montgomery	I-70	Add climbing lanes for trucks at Mineola Hill, reduce grade	5,000		
CD	Cooper	I-70	Replace bridge over Missouri River at Rocheport	230,000		
KC SW	Various	I-49	Complete Connection of I-49 between Missouri and Arkansas	51,000		